

20. Blades cordate; awn of fertile lemma arising from the base.....43. *Arthraxon*.
20. Blades not cordate; awn of fertile lemma, if present, arising from the tip or from between the teeth of a bifid apex.
21. Racemes in pairs, one sessile, the other peduncled, included in an inflated spathe, these aggregated into a large compound inflorescence; lowest pair of spikelets in one or both racemes homogamous.....45. *Cymbopogon*.
21. Inflorescence not as above.
22. Glumes firmly indurate, smooth and shining.....41. *Sorghum*.
22. Glumes membranous-coriaceous, often more or less prominently nerved.....44. *Andropogon*.
19. Fertile spikelets disarticulating obliquely, the callus pungent-pointed.
23. Racemes without pairs of homogamous spikelets at base.....42. *Chrysopogon*.
23. Racemes with 1 or more pairs of homogamous spikelets at base, these staminate or neuter.
24. Racemes capitate, solitary, long-exserted.....48. *Germainia*.
24. Racemes not as above.
25. Fertile spikelets dorsally flat or grooved; first glume chartaceous.....46. *Hyparrhenia*.
25. Fertile spikelets terete; first glume coriaceous.
26. Homogamous pairs of spikelets 2, approximate and forming a sort of involucre at base of the 1-3-jointed raceme; inflorescence a large spatheate panicle.....47. *Themeda*.
26. Homogamous pairs of spikelets 1 to many at base of the several to many-jointed raceme; inflorescence a solitary spikelike raceme terminating the culms and branches; sterile spikelets obliquely lanceolate, imbricate and obscuring the fertile spikelets.....49. *Heteropogon*.

23. *Dimeria* R. Br.

Dimeria R. Br., Prodr. Fl. Nov. Holl. 1: 204. 1810.

Haplachne Presl, Rel. Haenk. 1: 234. pl. 38. 1830.

Woodrowia Stapf, Hook. Ic. 25: pl. 2447. 1896.

Spikelets strongly laterally compressed, short-pedicled, solitary in two rows on one side of a trigonous or flattened continuous rachis; glumes keeled, often winged, only slightly indurate, the margins usually hyaline; first glume usually narrower and slightly shorter than the second; lemmas hyaline, the sterile shorter, awnless, the fertile rarely awnless, usually awned from the bifid apex, the awn geniculate, the basal segment brown and twisted; stamens 2. Annuals or perennials with usually slender culms and digitate or approximate, sometimes solitary, racemes.

TYPE SPECIES: *Dimeria acinaciformis* R. Br.

KEY TO THE SPECIES

1. Spikelets 3.5-5 mm. long.
2. Racemes solitary.....1. *D. monostachya*.
2. Racemes 2 to 5.
3. Both glumes prominently winged on the keel; rachis 1 mm. wide, densely ciliate on the margins.....2. *D. dipteros*.
3. First glume not winged; rachis about 0.8 mm. wide, scabrous or only sparsely ciliate on the margins.....3. *D. ciliata*.

1. Spikelets 2–2.5 mm. long.
 4. Second glume not winged on the keel; fertile floret awned, the awn geniculate.4. *D. ornithopoda*.
 4. Second glume winged on the keel; fertile floret awnless or with a reduced straight awn.5. *D. glabriuscula*.

1. *Dimeria monostachya* sp. nov. PLATE V, Figs. a, b.

Annua 25–45 cm. alta; culmis filiformibus, erectis, glabris; nodis breviter barbatis, circiter 7; vaginis carinatis, pilosis, pilis circiter 1 mm. longis; ligula membranacea, circiter 0.5 mm. longa; laminis planis vel conduplicatis, erectis, 2–3 mm. latis, inferioribus 4–8 cm. longis, ad apicem culmis brevioribus, marginibus plus minusve revolutis, utrinque pilosis, pilis quam eis vaginae paullo longioribus; racemo solitario, 5–7 cm. longo, floribus confertis; rhachi circiter 0.8 mm. lata, complanata, dorso leviter rotundato, marginibus dense ciliatis; pedicellis complanatis, circiter 0.2 mm. longis; spiculis imbricatis, 3.5–4 mm. longis; glumis dense albo-pilosis, carinis longe ciliatis; gluma prima acuta, quam gluma secunda paullo brevior, carina haud alata; gluma secunda acuminata, quam gluma prima duplo latiore, carina tota longitudine late alata, margine ciliato, ceterum glabra; lemmate sterili quam fertili paullo brevior; lemmate fertili quam spicula circiter quarta parte brevior, arista circiter 8 mm. longa, columna 1–1.5 mm. longa; antheris circiter 0.8 mm. longis.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, Brass 7806 (A, TYPE, US), September, 1936 (gregarious on wetter savannahs).

Closely related to *Dimeria sinensis* Rendle, but differing in having larger spikelets in which the second glume is acuminate rather than obtuse, and in the shorter awn in which the column is 1–1.5 mm. long rather than 3–4 mm. as in *D. sinensis*. The habit suggests *D. pusilla* Thwaites, but that species is smaller and has larger spikelets in which the glumes are aristate.

The above specimen was reported as *Dimeria falcata* Hack. by Chase (17, p. 313).

2. *Dimeria dipteros* sp. nov. PLATE VI.

Annua 30–80 cm. alta; culmis glabris, simplicibus, erectis vel adscendentibus; nodis barbatis, pilis adscendentibus circiter 2 mm. longis; vaginis carinatis, dense pilosis, quam internodiis longioribus; ligula membranacea, ciliolata, circiter 0.6 mm. longa; laminis erectis, planis, 5–12 cm. longis, 3–5 mm. latis (summa valde redacta) dense pilosis; racemis binatis vel ternatis, 5–8 cm. longis; rhachi circiter 1 mm. lata, anguste alata, alis dense rigido-ciliatis, pilis 0.5–1 mm. longis, ceterum glabra; pedicellis complanatis, circiter 0.5 mm. longis, marginibus apicem versus rigido-ciliatis, pilis quam pedicellis paullo longioribus; spiculis plus minusve pubescentibus, anguste obovatis, callo breve barbato; glumis subaequalibus, acutis, carinis late alatis, marginibus ciliatis, pilis apicem versus brevioribus; gluma prima 4–4.5 mm. longa, carina quam corpo glumae plerumque paullo latiore; gluma secunda 4.5–5 mm. longa, 1.5 mm. lata, carina circiter 0.5 mm. lata, apicem versus paullo latiore; lemmate sterili scariosa, ciliata, 2.5–3 mm. longa; lemmate fertili 3.5–4 mm. longa, aristata; arista 8–10 mm. longa, e apicem lemmatis bifida, columna 1.5–2 mm. longa; antheris 1.5 mm. longis.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1900 m., Brass 4802 (GH, US) (a few plants among sedges in small swampy hollows on

grassland). NETHERLANDS NEW GUINEA: Balim River, alt. 1800 m., *Brass* 11738 (A, US, TYPE), Dec. 1938 (common on sandy, long deforested slopes).

Related to *Dimeria bialata* C. E. C. Fisch. but that species is much smaller and has much shorter racemes, slightly smaller more glabrous spikelets, anthers 1 mm. long, and an awn with the column about 3 mm. long.

Comparison may also be made with *Dimeria chloridiformis* (Gaudich.) K. Schum. & Lauterb., but that species has somewhat longer leaves, culms which are pubescent below the inflorescence, racemes in 4's or 5's, and the common axis pubescent rather than glabrous. The greatest difference, however, is seen in the spikelets, in which the first glume is apiculate and wingless, the second acuminate and with only a very small wing just below the tip. The anthers are 1.8 mm. long.

Brass 4802 was reported as *Dimeria chloridiformis* by Hitchcock (35, p. 124).

3. *Dimeria ciliata* Merr., Philip. Jour. Sci. Bot. 9: 262. 1914. Type from the Philippines.

Perennial; culms slender, tufted, more or less pubescent, 50–85 cm. tall; nodes bearded, the hairs stiffly ascending, 1–1.5 mm. long; sheaths slightly shorter than the internodes, more or less pilose, keeled, at least above; ligule about 0.8 mm. long, membranous, often ciliate; blades more or less densely pilose, 8–25 cm. long, 3–5 mm. wide; inflorescence long-exserted, of 3–6 racemes, the common axis about 1 mm. long; racemes 7–13 cm. long, the rachis trigonous, about 0.8 mm. wide, glabrous or slightly ciliate on the margin, sometimes slightly pubescent on the back; pedicels 0.8–1 mm. long, rather stout, ciliate on the outer margins; spikelets 4–4.5 mm. long, the glumes prominently ciliate with long white hairs on the keels; the first glume slightly shorter and narrower than the second, not winged; second glume with a prominent wing on the keel toward the apex, the lower half wingless; sterile lemma about 3 mm. long, ciliate; fertile lemma about 3.5 mm. long, the awn about 10 mm. long; anthers about 1 mm. long.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. about 40 m., *Brass* 5911 (A, US, NY) (scattered in small, spreading tufts on damp ridge slopes).

Philippines, New Guinea.

Related to *Dimeria chloridiformis* (Gaudich.) K. Schum. & Lauterb., from the Marianas, but differing in the smaller spikelets, less pubescent foliage, and narrower rachises, which are not densely ciliate.

Brass 5911 was reported as *Eulalia argentea* Brongn. var. *queenslandica* (Domin) Hitchc. by Hitchcock (35, p. 126). The combination which he makes there is a valid one but does not apply to the New Guinea plants.

3a. *Dimeria ciliata* Merr. var. *heteromorpha* var. nov.

A typo differt culmis vaginisque glabris, laminis glabris vel marginibus plus minusve pilosis basi tuberculatis, ala glumae secundae interdum ad basin imam extendit.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass* 7807 (A, TYPE, US), Sept. 1936 (gregarious in small patches on wet savannahs), *Brass* 7932 (A, US) (plentiful on moist savannah slopes).

Differs from the species in having glabrous culms and sheaths, the blades glabrous or with the margins more or less tuberculate-pilose, and the wing of the second legume sometimes extending all the way to the base. The varietal epithet refers to the variable nature of the spikelets. Within the same inflorescence, in some spikelets the second glumes are winged only at the apex as in typical *Dimeria ciliata*, in others the wings extend entirely to the base, and there are numerous intergradations.

4. *Dimeria ornithopoda* Trin., Fund. Agrost. 167. fig. 14. 1820; C. T. White, Proc. Roy. Soc. Queensl. 34: 14. 1923. Type from India.

Annual; culms glabrous, slender, tufted, 15–30 cm. tall (rarely taller), the nodes bearded; sheaths mostly shorter than the internodes, keeled, glabrous to papillose-pilose; ligule about 0.5 mm. long; blades erect, as much as 6 cm. long, 2–3 mm. wide, glabrous or papillose-pilose; racemes binate or ternate, 2–5 cm. long, the rachis undulate, trigonous, about 0.3 mm. wide or less, the margins scabrous; pedicels very short; spikelets 2–2.5 mm. long, the callus short-bearded; glumes subequal, acute, scabrous or somewhat pubescent, the keels not winged; fertile lemma slightly shorter than the first glume and bearing a geniculate awn, the column of which is about as long as the spikelet; anthers about 0.5 mm. long.

Widely distributed in the tropics and subtropics of the Old World.

No specimens of this species were seen from New Guinea — the description was drawn up from Philippine and Australian specimens. Included here since it was reported by White, and it seems probable that it occurs in New Guinea.

5. *Dimeria glabriuscula* F. M. Bailey, Syn. Queensl. Fl. Suppl. 3: 83. 1890. Type from Australia.

Dimeria glabra Ridley, Fl. Malay Penin. 5: 192. 1925; Hitchc., Brittonia 2: 125. 1936. Type from Singapore.

Annual; culms glabrous, erect, tufted, very slender, 20–50 cm. tall, the nodes minutely bearded; sheaths keeled, glabrous or slightly ciliate on the margins; ligule about 0.5 mm. long; blades 2–6 cm. long, 2–3 mm. wide, glabrous or slightly pubescent; racemes binate or ternate, 3–6 cm. long, the trigonous rachis about 0.4 mm. wide, undulate, the margins scabrous; pedicels very short; spikelets 2–2.5 mm. long, the callus not bearded; glumes subequal, acute, the first narrow, scabrous, the second about twice as wide as the first, scabrous or rarely slightly puberulent, the keel with a narrow wing extending quite or nearly to the base; fertile lemma slightly shorter than the first glume, awnless or with a short straight awn (rarely a few of the spikelets with a geniculate awn); anthers about 0.5 mm. long.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass* 5984 (GH, US) (in small patches or colonies on damp grass slopes); Lake Daviumbu, Middle Fly River, *Brass* 7850 (A, US) (rare grass, gregarious on wet savannahs).

Singapore, Netherlands Indies, the Philippines, New Guinea to Australia.

Closely related to *Dimeria ornithopoda* but differing in being more nearly glabrous and in having a more erect habit. Further differences are seen in the spikelets, which are not bearded on the callus, have the second glume winged on the keel, and the fertile lemma awnless or with a reduced straight awn.

24. *Imperata* Cyrillo

Imperata Cyrillo, Pl. Rar. Neap. 2: 26. *pl.* 11. 1792.

Spikelets more or less dorsally compressed, all alike and perfect, usually in pairs (rarely solitary), unequally pediceled, along a slender continuous rachis, surrounded by long silky hairs from the base and lower part of the glumes; glumes about equal, membranous; lemmas hyaline, awnless, shorter than the glumes; styles 2; stamens 1 or 2. Perennials with stout creeping rhizomes and more or less spikelike, conspicuously silky panicles.

TYPE SPECIES: *Imperata arundinacea* Cyrillo = *I. cylindrica* (L.) Beauv. (*Lagurus cylindricus* L.).

KEY TO THE SPECIES

1. Stamens 2; panicle dense, spikelike.....1. *I. cylindrica*.
 1. Stamen 1; panicle somewhat open (rather dense in high altitude form).....
2. *I. exaltata*.

1. *Imperata cylindrica* (L.) Beauv., Ess. Agrost. 165, 177, *pl.* 5, *fig.* 1. 1812; Hitchc., Brittonia 2: 125. 1936; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 111. *fig.* 64. 1940.

Lagurus cylindricus L., Syst. Nat. ed. 10. 2: 878. 1759. No locality given.

Imperata arundinacea Cyrillo, Pl. Rar. Neap. 2: 27. *pl.* 11. 1792; F. Muell., Vict. Nat. 1: 168. 1844; Hack. in DC., Monogr. Phan. 6: 92. 1889. Type from Italy.

- 1a. *Imperata cylindrica* (L.) Beauv. var. *major* (Nees) C. E. Hubb. in C. E. Hubb. & Vaughan, Grass. Maurit. and Rodriguez 96. 1940.

Saccharum Koenigii Retz., Obs. Bot. 5: 16. 1789. Type from Japan.

Imperata Koenigii (Retz.) Beauv., Ess. Agrost. 165. 1812.

Saccharum confertum Presl, Rel. Haenk. 1: 346. 1830. Type from the Philippines.

Imperata Koenigii (Retz.) Beauv. var. *major* Nees, Fl. Afr. Austr. 90. 1841. Type from Africa.

Imperata arundinacea Cyrillo var. *Koenigii* (Retz.) Benth., Fl. Hongk. 419. 1861; Hack., Bot. Jahrb. 6: 238. 1855, in DC., Monogr. Phan. 6: 94. 1889.

Imperata cylindrica (L.) Beauv. subvar. *Koenigii* (Retz.) Durand & Schinz, Consp. Fl. Afr. 5: 694. 1894.

Imperata cylindrica (L.) Beauv. var. *Koenigii* (Retz.) Pilger in Perk., Fragm. Fl. Philip. 137. 1904; Hack., Denkschr. Akad. Wiss. Math.-Naturw. (Wien) 89: 492. 1913.

Imperata conferta (Presl) Ohwi, Bot. Mag. (Tokyo) 55: 549. 1941.

Culms erect, simple, slender to moderately stout, 40–120 cm. tall, mostly 1- to 3-noded, the nodes bearded; sheaths overlapping, keeled, glabrous or slightly pubescent; ligule truncate, 0.5–1 mm. long; blades linear-lanceolate, broadest at the middle and tapering to either end, flat, very variable in length, 10–50 cm. or more long, 5–15 mm. wide, glabrous or hairy at the base, scabrous on the margins; panicle usually densely cylindrical, sometimes slightly branching at the base, 5–22 cm. long; spikelets 3–4 mm. long, the hairs about 10 mm. long; glumes subequal, membranous, 3–7-nerved; anthers 2, borne on long slender filaments.

BRITISH NEW GUINEA: Western Division: Gaima, Lower Fly River, Brass 8296 (A, US) (covering old clearings in both savannah and rain-forest).

NORTHEAST NEW GUINEA: Morobe District: Near Kajabit Mission, alt. about 200 m., Clemens 10668b (US); in the Ramu Valley near the headwaters of the Markham River, Rogers 3001 (A); four miles south of Langemak Bay, Sawyer 81 (A); near Yabim, H. Zahn in 1903 (US).

East Africa, Indo-Malayan region, New Guinea to Australia. Also Japan.

Imperata cylindrica is an extremely variable and wide-ranging species, and hence it has a large number of synonyms. C. E. Hubbard (Imp. Agric. Bur. Joint Publ. 7:5-13. 1 map. 1944) recognizes five varieties, one of which occurs in South America and the rest in the Old World. Variety *major*, to which our plants appear to belong, has a greater range than the others and probably a greater variability. According to Hubbard, each of the varieties has a rather definite geographic distribution.

2. *Imperata exaltata* Brongn. in Duperry, Bot. Voy. Coquille 2(2): 101. 1831; Hack. in DC., Monogr. Phan. 6: 98. 1889; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 165. 1901; Hitchc., Brittonia 2: 125. 1936. Type from Waigiou Island.

Saccharum macilentum Chauvin ex Steud., Syn. Pl. Glum. 1: 406. 1854; F. Muell., Pap. Pl. 1: 47. 1876. Type from Waigiou Island.

Culms 60-150 cm. tall (rarely only 25 cm. in subsp. *Merrillii*), slender in proportion to their height, 3-4-noded, the nodes not bearded; sheaths overlapping, more or less keeled; ligule truncate, shortly ciliate, 0.5-1.5 mm. long; blades lanceolate-linear or rarely linear, flat or sometimes involute, 25-80 cm. long, 6-20 mm. wide, the base attenuate and distinctly canaliculate at the junction of the sheaths, glabrous or pilose only at the base, the margins scabrous; panicle as much as 40 cm. long, 3-7 cm. wide, with numerous short rather lax branches especially toward the base; spikelets 2.5-3 mm. long, the hairs 2 to 3 times as long; glumes subequal, 3-nerved; stamen 1, 2-2.5 mm. long.

BRITISH NEW GUINEA: Islands near the southeast end, *Armit 55* (US); Central Division: Urunu, Vanapa Valley, *Brass 4813* (A, US) (common on paths through old garden lands); Kanosia, *Carr 11244* (NY) (on open savannah land); Western Division: Junction of the Black and Palmer Rivers, *Brass 6945* (A, US) (forming dense pure stands on a gravel island in the Palmer River); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 813* (A, US) (bank of creek in partial shade). NORTHEAST NEW GUINEA: Morobe District: Huon Gulf, *Herre 231* (NY). NETHERLANDS NEW GUINEA: Nassau region, Explorat Biv., alt. about 700 m., *Docters van Leeuwen 10500* (GH). NEW BRITAIN: *Parkinson 65* (US).

Southeastern Asia to New Guinea.

- 2a. *Imperata exaltata* Brongn. subsp. *Merrillii* Hack., Philip. Jour. Sci. 1: Suppl. 264. 1906. Type from the Philippines.

Differs from the typical form in having narrower blades and a shorter, denser panicle. The spikelets seem to be identical and have only one stamen as in the species.

BRITISH NEW GUINEA: Central Division: Wharton Range, Murray Pass, alt. 2840 m., *Brass 4721* (A, US) (common on hillsides and in open country). NETHERLANDS NEW GUINEA: Northern slopes of Mount Wilhelmina, Wemena River, alt. 3200 m., *Brass & Meyer-Drees 10235* (A, US) (covering beaches of gravel and sand); 9 km. northeast of Lake Habbema, alt. 2600 m., *Brass 10902* (A, US) (on old landslip in forest); Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11491* (A, US) (dominant grass on old garden lands).

Philippines and New Guinea.

The cited specimens look superficially like *Imperata cylindrica* and were cited under this name by Chase (24, p. 88). They differ in having slightly smaller spikelets with only one stamen. This is apparently a

high altitude form of *I. exaltata* and perhaps not worthy of subspecific status.

25. *Miscanthus* Anderss.

Miscanthus Anderss., Oefv. Svensk. Vet. Akad. Foerhandl. Stockh. 1855: 165. 1856.

Eulalia Trin., Mém. Acad. St. Pétersb. VI. 2: 332. 1832 (non Kunth, 1829).

Xiphagrostis Coville, Contr. U. S. Nat. Herb. 9: 399. *pl.* 69. 1905.

Spikelets all alike and perfect, in pairs, unequally pediceled on a continuous rachis, the callus villous; glumes subequal, chartaceo-membranous; lemma hyaline, the fertile bifid and awned or rarely awnless, the awn twisted, straight or slightly geniculate. Tall perennials with long flat or convolute blades and large open terminal panicles of several to many racemes.

TYPE SPECIES: *Miscanthus japonicus* Anderss. = *M. floridulus* (Labill.) Warb. (*Saccharum floridulum* Labill.).

1. *Miscanthus floridulus* (Labill.) Warb. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 166. 1901; C. T. White, Proc. Roy. Soc. Queensl. 34: 15. 1923. *Saccharum floridulum* Labill., Sert. Austro. Caled. 13. *pl.* 18. 1824. Type presumably from New Caledonia.

Miscanthus japonicus Anderss., Oefv. Svensk. Vet. Akad. Foerhandl. Stockh. 1855: 166. 1856; Warb., Bot. Jahrb. 16: 13. 1892; Hitchc., Proc. Linn. Soc. N. S. Wales 54: 145. 1929 (non *Saccharum japonicum* Thunb. 1794). Type from Japan.

Culms in large clumps, erect, robust, 1.5–4 meters tall; sheaths overlapping, glabrous, not keeled; ligule membranous, about 1 mm. long, often ciliate; blades 25–80 cm. long, 10–30 mm. wide, rather firm, the margins serrulate-scabrous; panicle broad, flabellate, 15–40 cm. long, the central axis about two-thirds as long; lower branches 15–20 cm. long, the rachis glabrous or sometimes pilose; spikelets 3–5 mm. long, the soft spreading callus hairs about as long; awn about 3–8 mm. long.

BRITISH NEW GUINEA: Gulf Division: Ihu, Vailala River, *Brass* 920 (GH, US) (in large thickets on the river banks); Central Division: Wharton Range, Murray Pass, alt. 2800 m., *Brass* 4191 (A, US) (large tussock grass scattered on open slopes), *Brass* 4528 (GH, US) (rare; sporadic on open grasslands), *Brass* 4723 (US) (rare; in large clumps on open country); Urunu, Vanapa Valley, alt. 1900 m., *Brass* 4778 (GH, US) (covers large areas of old garden land on deforested valley slopes. NORTHEAST NEW GUINEA: Morobe District: Sattelberg, Ogeramang, alt. about 1800 m., *Clemens* 4454 (A); Sarawaket, alt. about 2500 m., *Clemens* 6145 (A). NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habema, alt. 2200 m., *Brass* 11584 (forming occasional thickets in open second growths); Balim River, alt. 1600 m., *Brass* 11809 (A, US) (a few clumps on river bank).

Eastern Asia to Polynesia.

26. *Saccharum* L.

Saccharum L., Sp. Pl. 54. 1753; Gen. Pl. ed. 5. 28. 1754.

Spikelets all alike and perfect, awnless, in pairs, one sessile, the other pediceled on an articulate fragile rachis, this disarticulating below the spikelets; glumes equal, somewhat indurate, often more firm below, the first usually 2–4-nerved (rarely with a midnerve), the second 1–5-nerved; sterile lemma hyaline, about as long as the glumes; fertile lemma much reduced or wanting. Tall perennials with large silky terminal panicles.

TYPE SPECIES: *Saccharum officinarum* L.

1. *Saccharum spontaneum* L., Mant. 2: 183. 1771; F. Muell., Pap. Pl. 1: 46. 1879; Hack., Bot. Jahrb. 6: 238. 1885, in DC., Monogr. Phan. 6: 113. 1889. Type from India.

Imperata spontanea (L.) Beauv. ex Roem. & Schult., Syst. 2: 289. 1817.

Saccharum robustum Brandes & Jeswiet ex Grassl, Jour. Arnold Arb. 27: 234. 1946. Type from New Guinea.

Culms in dense tufts or clumps, 2–10 meters tall, slender and more or less woody at base to robust and pithy, erect or somewhat decumbent at base; sheaths longer than the internodes, sparsely to densely pubescent, the hairs usually more dense near the margins; ligule membranous, short ciliate, 1.5–4 mm. long; blades long-linear, 1–5 (rarely 7) cm. wide, the margins serrulate-scabrous; panicle 20–90 cm. long, the fragile branches suberect or spreading; rachis long-pilose or only scabrous; spikelets 3–5.5 mm. long, the glumes usually more or less firmly indurate and often reddish on the lower half, the upper margins ciliate; sterile lemma well developed, about as long as the glumes; fertile lemma very much reduced or completely wanting.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass* 3628 (A, US) (on roadsides in savannahs, not common); near Port Moresby, Rauna Falls, *Jeswiet* in 1928 (US); Kanosia, *Carr* 11129 (NY) (open savannah land); banks of the Laloki River, about 27 km. from Port Moresby, *Jeswiet* in June, 1928 (US) (type of *S. robustum*); Northern Division: Near Dobodura, on banks of Samboga River, *Reeder* 828 (A, US) (on gravelly soil; culms 3–4 meters tall); Western Division: Palmer River, *Brass* 6957 (A) (stands 3–4 meters high on gravel banks of the river). NORTHEAST NEW GUINEA: Morobe District: *Clemens* 6558 (A); Wareo, alt. 625 m., *Clemens* 1410 (A); Ongerman [sic], on the Sepik River, *Herre* 284 (NY) (on river banks; plants 10–20 feet high; covers tens of thousands of acres extending along the Sepik River for over 500 m. from the sea and beyond for an unknown distance). NETHERLANDS NEW GUINEA: Near Hollandia, *Brass* 8920 (A) (forming small thickets 2–3 meters high along the river); 18 km. northeast of Lake Habbema, Bele River, alt. 2200 m., *Brass* 11374 (A, US) (very abundant in tall thickets on abandoned garden land, 2.5–3 meters high); Balim River, alt. 1600 m., *Brass* 11778 (A, US) (abundant on alluvial soil of river banks; gregarious in clumps about 2 meters high); 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass* 13264 (A, US) (colonizing sand and gravel beaches in river; thickets up to 8 meters high); Bernhard Camp, Idenburg River, alt. 50 m., *Brass* 13791 (A, US) (in dense pure stands 7–8 meters high on recent silt deposits of the river banks).

Widely distributed from the Indo-Malayan region to New Guinea and adjacent islands.

Saccharum robustum Brandes & Jeswiet ex Grassl is here treated as a synonym, since the distinctions given by Grassl as separating it from *S. spontaneum* do not seem to hold. In the discussion following the original description one reads that *S. robustum* is “distinguished readily” by the reduced third glume [fertile lemma], the sparser and shorter hairs on the rachis and callus, the smaller spikelets, and the much larger size of the plants themselves. Examination of available specimens shows that these distinctions have little basis in fact. The fertile lemma is reduced in all the cited specimens, although the degree of reduction varies in different plants and even in different spikelets in the same panicle. Grassl implies that the large, robust plants (*S. robustum*) have small spikelets, while in the smaller plants (*S. spontaneum*) the spikelets are larger. *Carr* 11129

is a small plant with a slender, woody culm, yet the spikelets are only about 3 mm. long. *Brass 6957* has rather robust culms, broad blades, and small spikelets, yet on the label the height of the plant is given as "3-4 m." *Brass 11374* has the broad blades and robust culms of *S. robustum*, yet the spikelets are 5-5.5 mm. long, and the height of the plants is given as only 2.5-3 meters. There seems also to be little correlation between the size of the spikelets and the length of the hairs on the rachis and callus. In view of the difficulty, if not impossibility, of separating coherent groups from the New Guinea material, it seems advisable to consider it as one polymorphic species pending further detailed collecting and field study.

2. *Saccharum officinarum* L., Sp. Pl. 54. 1753; Hack. Bot. Jahrb. 13: 263. 1890; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 114-116. fig. 66. 1940. Type from India.
Saccharum sinense Roxb., Fl. Ind. 1: 244. 1820; Ohwi, Bot. Mag. (Tokyo) 56: 9. 1942. Described from specimens in Botanical Garden introduced from China.

This is the cultivated sugar cane. It is widely distributed and cultivated by natives throughout the Island and is spontaneous in old garden lands. The culms are 2-6 meters tall and 2-4 cm. in diameter. The lower internodes are often very short and stout. No herbarium specimens of this species from New Guinea have been seen. Living plants were observed in native gardens on numerous occasions while the writer was there in 1943-44. Unfortunately no specimens were collected.

3. *Saccharum edule* Hassk., Flora 25: Beibl. 3. 1842. Type from Java.
Saccharum spontaneum L. var. *edulis* (Hassk.) K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 166. 1901.

In this species the inflorescence fails to develop normally and remains permanently enclosed within the sheaths of the upper leaves. This abortive inflorescence is roasted and eaten as a vegetable by the natives. Since it produces no flowers, the plant can be propagated only by vegetative means. Grassl (Jour. Arnold Arb. 27: 240-242. 1946) discusses the relationship of this horticultural species with other species of *Saccharum*. He also (op. cit. pl. 2, fig. 1, 2) figures the abortive inflorescence. The species is apparently cultivated throughout the island. As seen growing, it resembles *S. officinarum*, but the culms are dry and do not contain sweet juice. Hackel (24, p. 263) doubtfully reports *S. edule* from New Guinea.

No specimens of this species were available to the writer, but living plants were observed in a native garden in British New Guinea in 1943. As in the case of the former species, no specimens were collected.

27. *Erianthus* Michx.

Erianthus Michx., Fl. Bor. Amer. 1: 54. 1803.

Spikelets all alike and perfect, awned or awn-pointed, in pairs along a slender rachis, one sessile, the other pediceled, the rachis disarticulating below the spikelets, the rachis joint and pedicel falling attached to the sessile spikelet; glumes coriaceous, equal, usually clothed with long spread-

ing silky hairs; sterile lemma hyaline, empty; fertile lemma hyaline, the midnerve extending into a prominent awn or the lemma at least awn-pointed. Perennials with dense terminal silky panicles.

TYPE SPECIES: *Erianthus saccharoides* Michx. = *E. giganteus* (Walt.) Muhl. (*Anthoxanthum giganteum* Walt.).

KEY TO THE SPECIES

1. Fertile lemma mucronate or the awn only about 1 mm. long; panicle 25–60 cm. long.....1. *E. arundinaceus*.
1. Fertile lemma with an awn as long as the spikelet or longer; panicles about 15 cm. long.....2. *E. fastigiatus*.

1. ***Erianthus arundinaceus*** (Retz.) Jesw., Arch. Suikerind Nederland Indië Meded. 33: 399. 1925; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 118. 1940.
Saccharum arundinaceum Retz., Obs. Bot. 4: 14. 1786; Hack. in DC., Monogr. Phan. 6: 117. 1889; Ridley, Trans. Linn. Soc. II. (Bot.) 9: 249. 1916. Type from India.

Culms robust, 2–5 (sometimes to 7) meters tall, 1–2 cm. in diameter; sheaths longer than the internodes, glabrous, often pruinose; ligule membranous, ciliate, 1–2 mm. long; blades flat, linear, 30–150 cm. long, 10–70 mm. wide, glabrous, smooth, the margins serrulate-scabrous; panicle large, plume-like, 25–60 cm. long, the branches ascending or somewhat spreading; spikelets 3.5–4 mm. long, the callus short-bearded; glumes acuminate, the dorsal surface clothed with long spreading hairs or the second glume sometimes glabrous or nearly so; sterile lemma about equaling the glumes; fertile lemma slightly shorter, the midnerve extending into a short mucro or an awn as much as 1 mm. long; fertile palea about half as long as the lemma.

BRITISH NEW GUINEA: Western Division: Fly River, about 30 miles below Everill Junction, *Brass* 6582 (A, US) (in pure stands, 3–5 meters high; occupies many miles of the swampy banks of the middle river); Strickland River, *W. Bauerlen* 60 (US).

Indo-Malayan Region to New Guinea.

2. ***Erianthus fastigiatus*** (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6: 150. 1889.
Saccharum fastigiatum Nees ex Steud., Syn. Pl. Glum. 1: 409. 1855. Type from India.
Erianthus sesquimetalis Ohwi, Bot. Mag. (Tokyo) 56: 9. 1942. Type from Netherlands New Guinea.

Culms subrobust, 150 cm. or more tall, appressed-pilose at the summit, otherwise glabrous; sheaths 20–30 cm. long, appressed-pilose on the margins near the summit, otherwise glabrous; ligule truncate, minutely ciliate, about 0.7 mm. long; blades elongate, 30–80 cm. long, 5–8 mm. wide, rigid, glabrous except for a few hairs at the base; panicle short-exserted, erect, about 15 cm. long, 3–4 cm. wide, the axis clothed with long white hairs; racemes solitary, the lower about 4 cm. long, the rachis pilose with white spreading hairs, the joints about one-third shorter than the spikelets; pedicels rather slender and pilose like the rachis; spikelets lanceolate, about 4 mm. long; glumes acute, reddish brown except for the pale apex; first glume minutely bimucronate, flattened, the lower half near the margins bearing long white hairs; second glume 1-nerved, the lower part of the keel short-pilose; sterile lemma nerveless, slightly shorter than

the glumes, somewhat brownish below, the margins and scarious apex ciliate; fertile lemma about 1.5 mm. long, bidentate and bearing a brownish awn about 7-8 mm. long; palea about half as long as the lemma.

NETHERLANDS NEW GUINEA: Momi, 60 miles south of Manokwari, *Kanehira & Hatusima 13291* (type of *E. sesquimetalis* Ohwi) (fragment at A) (in waste plantation 10 m. above the sea).

The type of *Erianthus fastigiatus* has not been seen, but from the brief description in Steudel, and Hackel's detailed diagnosis, *E. sesquimetalis* seems referable to this species. A fragmentary specimen in the U. S. National Herbarium, from India, which seems to represent this species, has spikelets which are almost identical with those of the New Guinea plant except that the hairs on the first glume are slightly shorter.

28. *Eulalia* Kunth

Eulalia Kunth, Rev. Gram. 1: 160. 1829.

Pollinia Trin. sect. *Eulalia* (Kunth) Benth. & Hook., Gen. Pl. 3: 1127. 1883.

Pollinia Trin. subgen. *Eulalia* (Kunth) Hack. in DC., Monogr. Phan. 6: 152. 1889.

Spikelets paired, all alike and perfect, one pediceled and falling free from the pedicel, the other sessile and falling with the rachis joint and the pedicel of the upper spikelet (rarely both pediceled and disarticulating obliquely, forming a sharp-pointed callus, the pedicels remaining attached to the tardily disarticulating rachis joints); glumes subequal, the first dorsally flattened or rounded, sometimes slightly grooved, the second more or less keeled on the back, 1-3-nerved, sometimes awned; sterile lemma hyaline, as long as the glumes, reduced, or sometimes wanting; fertile lemma minute, usually reduced to the delicate base of a stout twisted and geniculate awn. Perennials or rarely annuals with usually erect culms, linear blades, and digitate or approximate racemes.

TYPE SPECIES: *Eulalia aurea* (Bory) Kunth (*Andropogon aureus* Bory).

KEY TO THE SPECIES

1. One spikelet pediceled, the other sessile; second glume awnless; rachis readily disarticulating at maturity, the joints falling attached to the sessile spikelet.
 2. Inflorescence golden brown; hairs on the spikelets of the same color, 5-10 mm. long.....2. *E. leptostachys*.
 2. Inflorescence grayish brown; hairs on the spikelets silvery, about 2 mm. long or less.....1. *E. trispicata*.
 1. Both spikelets pediceled; second glume with a slender awn 5 mm. or more long; rachis tardily disarticulating, the spikelets falling free from the pedicels.
 3. Spikelets reddish brown, about 0.4 mm. wide; fertile lemma with a twice geniculate awn 3-5 cm. long.....3. *E. irritans*.
 3. Spikelets brownish tan, about 0.7 mm. wide; fertile lemma awnless.....3a. *E. irritans* var. *egregia*.
1. *Eulalia trispicata* (Schult.) Henr., Blumea 3: 453. 1940; Ohwi, Bot. Mag. (Tokyo) 56: 10. 1942.
Andropogon tristachyos Roxb., Fl. Ind. 1: 261. 1820 (non *A. tristachyus* H.B.K. 1816). Type from India.
Andropogon trispicatus Schult., Mantissa 2: 452. 1824. Based on *A. tristachyos* Roxb.
Eulalia argentea Brongn. in Duperry, Bot. Voy. Coquille 2: 92. 1830; Hitchc., Brittonia 2: 125. 1936. Type from the Moluccas.

Pollinia argentea (Brongn.) Trin., Mém. Acad. St. Pétersb. VI. Sci. Nat. 2(1): 90, 1836; Hack. in DC., Monogr. Phan. 6: 162. 1889; K. Schum. & Hollr., Fl. Kais. Wilhelmsland 22. 1889.

Eulalia tristachya (Roxb.) Kuntze, Rev. Gen. 775. 1891; A. Camus, Ann. Soc. Linn. Lyon 68: 203. 1922.

? *Pollinia leptantha* Stapf, Kew Bull. 1909: 266. 1909. Type from Netherlands New Guinea.

Perennial (or sometimes annual?); culms erect, caespitose, 60–100 (rarely to 200) cm. tall, glabrous or slightly pubescent below the inflorescence; sheaths usually glabrous but sometimes pubescent, always more or less pubescent on the collar; ligule about 0.5 mm. long, ciliolate, usually with some longer hairs back of it; blades elongate, 3–5 mm. wide, flat, glabrous beneath, somewhat pilose above, especially near the base; racemes 3–20, digitate or approximate, 5–20 cm. long, the rachis clothed with soft white hairs, the joints about one-fourth shorter than the spikelet; pedicels slightly shorter than the rachis joint and bearing similar hairs; spikelets 2.5–3.5 (rarely to 4.5) mm. long; glumes equal, reddish brown, the first dorsally flattened, 2-nerved, the apex rounded; second glume 3-nerved, somewhat keeled; both glumes clothed with spreading white hairs, especially toward the margins, the hairs often 1 mm. long or more; sterile lemma about equaling the glumes, ciliate; fertile lemma 1.5–2 mm. long, bifid, the teeth often 1 mm. long, awned from between the teeth, the awn twisted and geniculate, 5–10 mm. long.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass* 5710 (A, US) (common on poorly drained grey soil of savannah ridges); Dagwa, Oriomo River, alt. 40 m., *Brass* 5926 (A, US) (the principal grass on damp soil on open ridges); Lake Daviumbu, Middle Fly River, *Brass* 7809 (A, US) (occasional in large tufts on savannahs), *Brass* 7950 (A, US) (occasional on wet savannah plains); Gaima, Lower Fly River, *Brass* 8279 (A, US) (occasional clumps on savannahs); Tarara, Wassi Kussa River, *Brass* 8566 (A, US) (occasional tufts in savannah-forests), *Brass* 8697 (A, US) (in native villages and gardens); Central Division: Sogeri, near Port Moresby, *L. S. Smith N. G.* 98 (A) (in open forest); Northern Division: About 3½ miles south of Dobodura, *Reeder* 821 (A, US) (in open grassland).

India to Australia, New Guinea, and Polynesia.

No type material of *Pollinia leptantha* was available, but from the description and study of numerous specimens of *Eulalia trispicata* from India to New Guinea, it does not appear to be distinct from that species.

2. *Eulalia leptostachys* (Pilger) Henr., *Blumea* 3: 453. 1940; Chase, *Jour. Arnold Arb.* 24: 88. 1943.

Pollinia leptostachys Pilger, *Bot. Jahrb.* 52: 170. 1914. Type from New Guinea.

Pollinia Cumingii sensu K. Schum. & Lauterb., *Fl. Deutsch. Schutzgeb. Südsee* 166. 1901. (Specimen cited is type of *P. leptostachys*.)

Perennial with scaly rhizomes; culms 40–70 cm. tall, erect or ascending, the base sometimes geniculate, appressed-white-pubescent below the inflorescence, otherwise glabrous; sheaths subglabrous to more or less pubescent, always more or less pilose at the throat; ligule about 0.5 mm. long, ciliolate; blades linear-lanceolate, 6–15 (rarely 20) cm. long and as much as 10 mm. wide, glabrous to more or less short-pubescent, the margins scabrous, the base abruptly narrowed into a very short petiole at the junction with the sheaths; panicle contracted, the branches, pedicels, and spikelets covered with gold-brown hairs; axis 2–4 cm. long, bearing

4–10 densely flowered racemes, about 8–10 cm. long; spikelets 3–4 mm. long, bearing spreading brown hairs about twice their length; first glume somewhat flattened and 2-keeled toward the apex, truncate, erose, and stiffly short-ciliolate, usually 2–4-nerved, sometimes also with a midnerve; second glume 1–3-nerved, obscurely keeled, the apex truncate-obtuse, ciliolate; sterile lemma usually wanting; fertile lemma minute, bifid, the slender lobes ciliate; awn 1–2 cm. long, the base weakly twisted and geniculate, the bend less than 1 mm. above the apex of the spikelet.

BRITISH NEW GUINEA: North Eastern Division: Mount Obree, alt. about 2000 m., *W. S. Sawyer* 76 (US). NORTHEAST NEW GUINEA: Morobe District: Ogeramang, alt. about 1700 m., *Clemens* 4725 (A); Kajabit Mission, alt. about 600 m., *Clemens* 10867 (US) (open place at foot of mountain). NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass* 10901 (A, US) (a few tufts on a dry open landslip in forest); Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass* 11363 (A, US) (covering light gravelly [formerly forested] banks of river); Balim River, alt. 1600 m., *Brass* 11825 (A, US) (locally abundant on long deforested slopes).

Endemic.

Eulalia leptostachys is related to both *E. Cumingii* (Nees) A. Camus and *E. fulva* (R. Br.) Kuntze, but it differs from both in having the panicle composed of longer, more numerous racemes, and spikelets with an awn which is only weakly twisted and geniculate, the bend occurring just above the tips of the glumes. *Eulalia fulva* has thick woolly culm bases and very thick racemes. *Eulalia Cumingii* has slender, creeping stolons, and the racemes are short and very slender. Both these species have been reported from New Guinea, but I have seen no specimens. They may represent misidentifications for *E. leptostachys*.

3. *Eulalia irritans* (R. Br.) Kuntze, *Rev. Gen.* 2: 775. 1891; Hitchc., *Brittonia* 2: 126. 1936.

Saccharum irritans R. Br., *Prodr. Fl. Nov. Holl.* 1: 203. 1810. Type from Australia.

Erianthus irritans (R. Br.) Kunth, *Rev. Gram.* 1: 160. 1829.

Pollinia irritans (R. Br.) Benth., *Fl. Austral.* 7: 525. 1879; Hack. in DC., *Monogr. Phan.* 6: 155. 1889.

Pseudopogonatherum irritans (R. Br.) A. Camus, *Ann. Soc. Linn. Lyon* 68: 205. 1921.

Annual; culms erect, 6–8-noded, glabrous, 60–100 cm. tall; sheaths glabrous, usually shorter than the internodes; ligule about 0.5 mm. long, minutely ciliolate; blades involute, attenuate, as much as 50 cm. long, glabrous below, glaucous and often more or less pubescent above, especially toward the base; panicle 10–15 cm. long, the common axis about 3 cm. long; racemes numerous, erect or ascending, the rachis very tardily disarticulating, about 0.4 mm. wide, the margins stiff-long-ciliate, the hairs longest toward the ends of the joints; spikelets reddish brown, more or less white-pilose, 2.5–3 mm. long, about 0.4 mm. wide (including the callus 3.5–4 mm. long), both alike and pediceled, the longer pedicel 2–2.5 mm., the shorter about 1 mm. long, the pedicels bearing hairs similar to those of the rachis; both spikelets disarticulating obliquely from the pedicels and forming a sharp callus bearing a tuft of stiff white hairs about half as long as the spikelet; glumes subequal, the first 2-nerved, rounded or flattened on the back, the apex minutely bidentate; second

glume 1-3-nerved, slightly keeled on the back, midnerve extending into a slender flexuous awn 5-7 mm. long with a short offset double bend at the base; sterile lemma wanting; fertile lemma narrow, hyaline, bearing a stout twice-geniculate awn, 3-5 cm. long, the lower half brown, twisted, and bearing white hairs 1.5-2 mm. long, the upper half pale and slender; anthers about 1 mm. long.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, *Brass* 5733 (A, US) (scattered on low grey soil of savannah ridges); Mabaduan, *Brass* 6524 (A, US) (rare grass in savannah forests); Lake Daviumbu, Middle Fly River, *Brass* 7645 (A, US) (not common in savannahs in this locality); Gaima, Lower Fly River, *Brass* 8251 (A, US) (open savannah forests, not common); Central Division: Port Moresby to Kalo, *MacGregor* 53 (US); South Eastern Division: *Chalmers* 71 (US).

Australia and New Guinea to the Philippines.

3a. *Eulalia irritans* (R. Br.) Kuntze var. *egregia* var. nov. PLATE VII, Figs. d, e.

A typo lemmate fertili mutica, spiculis latioribus et paullo longioribus, arista glumae secundae longioribus et paullo crassioribus, pedicellis paullo longioribus differt.

BRITISH NEW GUINEA: Western Division: Wai Kussa River, *MacGregor* 8 (US, TYPE), 1890.

The most striking character of this variety is the absence of the awn on the fertile lemma (one spikelet at the base of one of the racemes had an awn 30 mm. long, twice geniculate, and similar in other respects to those of the species; all other spikelets were without such awns). Further differences are seen in the spikelets, which are of a lighter brown color, noticeably broader and slightly longer, the awn of the second glume being somewhat longer and not so slender; the anthers are about 1.5 mm. long as compared with 1 mm. for *E. irritans*, and the pedicels are 1.5-2 mm. and 3 mm. long rather than 1 mm. and 2-2.5 mm. as in the species. Unfortunately only one specimen was available for study. With additional collections this form may prove to be a distinct species.

29. *Microstegium* Nees

Microstegium Nees in Lindl., Nat. Syst. 447. 1836.

Pollinia Trin., Mém. Acad. St. Pétersb. VI. 2: 304. 1832 (non Spreng. 1815).

Leptatherum Nees, Proc. Linn. Soc. 1: 92. 1841.

Spikelets in pairs, one sessile or subsessile, the other pediceled, both alike and perfect or the upper sometimes reduced, falling free from the pedicel, the lower spikelet falling with the joint of the rachis and the pedicel of the upper spikelet; glumes chartaceous or membranous, the first usually distinctly dorsally grooved, the second laterally compressed, cymbiform; sterile lemma wanting or rarely well developed, sometimes bearing a staminate flower; fertile lemma small, often reduced to a narrow base of a straight or twisted awn. Mostly annuals with straggling culms, lanceolate blades usually narrowed into short petioles, and few to many digitate or approximate racemes.

TYPE SPECIES: *Microstegium Willdenowianum* Nees = *M. vimineum* (Trin.) A. Camus (*Andropogon vimineus* Trin.).

KEY TO THE SPECIES

1. Rachis joints ciliate, shorter than the sessile spikelet; sterile lemma wanting or very much reduced.
 2. Blades 15–25 mm. wide; racemes 15–40.....1. *M. spectabile*.
 2. Blades mostly 4–12 mm. wide; racemes 2–10.....2. *M. ciliatum*.
1. Rachis joints glabrous, very slender, equaling or exceeding the sessile spikelet; sterile lemma about as long as the glumes.....3. *M. nudum*.

1. *Microstegium spectabile* (Trin.) A. Camus, Ann. Soc. Linn. Lyon 68: 200. 1921; Hosakawa, Jour. Soc. Trop. Agr. 7: 310. 1935.

Pollinia spectabilis Trin., Mém. Acad. St. Pétersb. VI. 2: 305. 1832; Hack. in DC., Monogr. Phan. 6: 174. 1889, Bot. Jahrb. 13: 260. 1890. Type from the Carolines.

Pollinia pleiostachya Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 168. 1901. Type from Northeast New Guinea.

Microstegium pleiostachyum (Lauterb. & K. Schum.) A. Camus, Ann. Soc. Linn. Lyon 68: 200. 1921.

Culms prostrate, branching, more than a meter long, firm, glabrous throughout or the lower nodes sometimes minutely bearded; sheaths striate, keeled above, glabrous or more or less papillose-pilose near the margins, the upper margins extending into slight auricles 1.5–2 mm. long connected by the membranous ligule; blades lanceolate, 10–18 cm. long, 15–25 mm. wide, the midrib whitish and prominent below, glabrous, the margins scabrous; apex acuminate, the base narrowed into a short petiole about 2 mm. long; panicle 8–14 cm. long, composed of 15–40 approximate racemes; rachis slender, bristly-ciliate on the margins, the joints slightly shorter than the subsessile lower spikelets, the pedicel about three-fourths as long as the rachis joint, also bristly-ciliate; lower spikelet 3–3.5 mm. long, the callus short-bearded; first glume obscurely 4-nerved (sometimes with a midnerve), the margins scabrous-pectinate toward the acuminate entire or minutely bifid apex; second glume 1–3-nerved, acuminate or aristulate, the prominent keel scabrous-pectinate; sterile lemma wanting; fertile lemma minute, bearing a slender capillary weakly twisted awn 1–3 times as long as the spikelet; anthers 1.5–2 mm. long; the upper spikelet similar but slightly smaller, the nerves of the glumes often more prominent.

BRITISH NEW GUINEA: Central Division: Koitaki, Carr 12236 (US) (in forest). NORTHEAST NEW GUINEA: Morobe District: Boana, alt. about 1000 m., Clemens 41715 (US). NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., Brass 13720 (A, US) (occasional in young seral rain-forest on sandy flood banks).

The Carolines to New Guinea and the Philippines.

Closely related to *Microstegium gratum* (Hack.) A. Camus, but differing in having glabrous culms, sheaths often papillose-pilose on the margins, and much more numerous racemes. *Microstegium gratum* has culms pubescent below the nodes and inflorescence, the awn of the fertile lemma stout and distinctly geniculate, and anthers about 3 mm. long. The Brass specimen was cited as *M. gratum* by Chase (18, p. 88). The specimens cited as *Pollinia grata* Hack. by Ridley (62, p. 249) and White (75, p. 15) may also represent *M. spectabile*. I have seen no specimens of *M. gratum* from New Guinea.

2. *Microstegium ciliatum* (Trin.) A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921.

Pollinia ciliata Trin., Mém. Acad. St. Pétersb. VI. 2: 306. 1832. Type from India.

Culms slender, 60–100 cm. tall, glabrous or the nodes sometimes puberulent; sheaths shorter than the internodes, glabrous or rarely pilose near the margins, the hairs sometimes papillose-based; ligule membranous, brownish, puberulent, 1–2 mm. long; blades linear-lanceolate, 5–10 cm. long, 4–10 (rarely to 15) mm. wide, acuminate, the base narrowed into a short petiole; racemes 2–10, 4–8 cm. long, approximate, the rachis ciliate, readily disarticulating, the joints slightly shorter than the spikelets; sessile spikelets 3–4.5 mm. long; first glume dorsally grooved, acute or bidentate; second glume acute or with a short awn; sterile lemma minute or wanting; fertile lemma minute, bearing a well developed awn; anthers about 1.5 mm. long.

2a. *Microstegium ciliatum* (Trin.) A. Camus var. *laxum* (Nees ex Steud.) comb. nov.

Pollinia laxa Nees ex Steud., Syn. Pl. Glum. 1: 401. 1854. Type from India.

Andropogon breviaristatus Steud., Syn. Pl. Glum. 1: 397. 1854. Based on *P. laxa*.

Pollinia ciliata Trin. var. *laxa* (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6: 176. 1889.

Microstegium breviaristatum (Steud.) Keng, Sinensia 3: 92. 1932.

Microstegium ciliatum (Trin.) A. Camus var. *latifolium* Ohwi, Bot. Mag. (Tokyo) 56: 10. 1942. Type from Netherlands New Guinea.

Differing from the species in having rachis joints only shortly ciliate, the first glume bidentulate, and the second glume bearing a capillary awn 1–4 mm. long; awn of the fertile lemma slender, flexuous, 8–20 mm. long.

NETHERLANDS NEW GUINEA: Waren, 60 miles south of Manokwari, *Kanehira & Hatusima 13243* (A, type collection of *M. ciliatum* var. *latifolium*) (in rain-forest).

3. *Microstegium nudum* (Trin.) A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921.

Pollinia nuda Trin., Mém. Acad. St. Pétersb. VI. 2: 307. 1832; Hack. in DC., Monogr. Phan. 6: 178. 1889. Type from India.

Eulalia nuda (Trin.) Kuntze, Rev. Gen. 2: 775. 1891.

Culms very slender, decumbent and rooting at the nodes; sheaths glabrous or minutely pubescent, the margins often ciliate; ligule membranous, about 0.2 mm. long; blades lanceolate or linear-lanceolate, 1.5–6 cm. long, 4–8 mm. wide, glabrous or the upper surface bearing scattered short papillose-based hairs; racemes 3–6, borne on a slender glabrous axis 6–12 mm. long; rachis slender, trigonous, glabrous, the joints about one and one-half times longer than the sessile spikelet, the slender glabrous pedicels one-third to half as long as the rachis joints; spikelets narrowly lanceolate, about 4 mm. long, glabrous except for the very short hairs on the callus; first glume 4–6-nerved, acute or bidentulate; second glume 1–3-nerved, minutely aristulate, prominently keeled on the back; sterile lemma hyaline, nerveless, about as long as the glumes; fertile lemma about one-fourth shorter, 1-nerved, the nerve extending into a very slender flexuous awn 8–15 mm. long.

NORTHEAST NEW GUINEA: Morobe District: Samanzing, alt. about 1600 m., *Clemens 10279* (US) (on steep open trail).

India to Japan, Formosa, and Malaysia.

30. *Pogonatherum* Beauv.

Pogonatherum Beauv., Ess. Agrost. 56. *pl. 11, fig. 7.* 1812.

Spikelets paired, one sessile and perfect, the other pediceled and pistil-

late, falling free from the pedicel, the sessile spikelet falling with the rachis joint and the pedicel of the upper spikelet; glumes membranous, subequal, the first 3-nerved, truncate, ciliate, the second 1-nerved, keeled and bearing a long slender awn from just below its bifid apex; lemmas hyaline, the sterile empty or wanting, the fertile bifid and bearing a long slender awn equaling or exceeding that of the second glume; stamens 2 or 1. Rather low and slender perennials with terminal solitary spikelike racemes.

TYPE SPECIES: *Pogonatherum saccharoideum* Beauv. = *P. paniceum* (Lam.) Hack. (*Saccharum paniceum* Lam.).

1. *Pogonatherum paniceum* (Lam.) Hack., Allg. Bot. Zeitschr. 12: 178. 1906; Hitchc., Proc. Linn. Soc. N. S. Wales 54: 145. 1929.
Saccharum paniceum Lam., Encycl. 1: 595. 1783, Illustr. 1: pl. 40, fig. 3. 1791.
Type from India.
Andropogon crinitum Thunb., Fl. Jap. 40. pl. 7. 1784. Type from Japan.
Pogonatherum saccharoideum Beauv., Ess. Agrost. 56, 176. pl. 11, fig. 7. 1812; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 168. 1901. Based on *Saccharum paniceum* Lam.
Pogonatherum crinitum (Thunb.) Kunth, Enum. 1: 478. 1833; Hack., Denkschr. Akad. Wiss. Math.-Naturw. (Wien) 89: 492. 1913.

Culms densely tufted, 15–40 cm. tall, delicate or somewhat coarse, the nodes often white-bearded; sheaths usually long-pilose in the throat, the margins often ciliate; ligule white, membranous, puberulent, about 0.5 mm. long; blades 2–5 cm. long, 1–4 mm. wide, flat or sometimes involute, often scabrous above; racemes solitary, 15–30 mm. long, slender, whitish or yellowish, the rachis joints and pedicels white-villous, about half as long as the spikelets; spikelets 2.5–3 mm. long, the callus hairs as long as the spikelets or shorter; first glume 3-nerved, the truncate apex ciliate; second glume laterally compressed, keeled, 1-nerved, the nerve extending into a long slender awn; sterile lemma shorter than the glumes (sometimes wanting), nerveless; fertile lemma shorter than the glumes, 1-nerved, long-awned from the bifid apex; palea often as long as the lemma; stamens usually 2 (sometimes 1), the anthers about 1.5 mm. long; awns of the second glume and fertile lemma similar, about 10 mm. long.

BRITISH NEW GUINEA: Central Division: Budotobara, *Brass* 768 (GH, US) (wet rock crevices); Mafulu, alt. 580 m., *Brass* 5270 (GH, US) (crevices in river-bed rocks); Kanosia, *Carr* 11345 (US, NY) (river banks, low down and subject to frequent flooding); Eastern Division: Kurandi, *Brass* 1391 (GH, US) (small grass in crevices of river-bed rocks); Western Division: Fly River, *Wm. Bauerlen* 43 (US); Fly River, 528-mile camp, alt. 80 m., *Brass* 6810 (A, US) (occasional on rocky river banks swept by floods); Lower Fly River opposite Sturt Island, *Brass* 8220 (A, US) (tufted on moist cliff face). NORTHEAST NEW GUINEA: Morobe District: *Clemens* 6548a (A); Kajabit, Markham Valley, *Clemens* 10552 (US); near Finschhafen, *Reeder* 886 (A, US) (growing in cracks of rocks above a waterfall in a small stream, abundant in this location). NETHERLANDS NEW GUINEA: Hollandia, *T. C. Baim* (sine no.) in 1945 (A) (dry gravelly bank of stream); Bele River, 18 km. northeast of Lake Habbema, alt. 2350 m., *Brass* 11568 (A, US) (abundant on a precipitous limestone slope); Balim River, alt. 1600 m., *Brass* 11631 (A, US) (abundant on dry rocky ground on deforested slopes); 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass* 13479 (A, US) (abundant on a flood-swept rocky river bank); Rouffaer River, alt. about 175 m., *Docters van Leeuwen* 9995 (GH, NY). SOLOMON ISLANDS: San

Cristoval: Hao River, *Brass* 2893 (GH) (rock crevices on the river bank; common); Ysabel: Maruto, alt. 300 m., *Brass* 3386 (GH) (on rocks in river bed, common).

Eastern Asia, Malaysia to Australia and New Guinea.

A very distinctive little grass, usually to be found growing in rock crevices along rivers. Easily recognized by its short, solitary, yellowish panicles with 2-awned spikelets.

31. *Sclerandrium* Stapf & C. E. Hubb.

Sclerandrium Stapf & C. E. Hubb., *Hook. Ic.* 33: *pl.* 3262. 1935.

Spikelets paired, dimorphic, one pediceled, the other sessile, the pairs alternately arranged along a slender, not or tardily disarticulating rachis; sessile spikelet more or less persistent on the rachis, dorsally compressed, bearing two staminate flowers; first glume indurated, shorter than the second, the apex truncate, emarginate or dentate; second glume membranous, obtuse to truncate, as long as the spikelet; lemmas hyaline, the lower obtuse, the upper mucronate or awned, stamens 2; pediceled spikelet readily disarticulating from the pedicel, bearing one perfect flower; glumes equal, coriaceous; fertile lemma bearing a long geniculate awn; stamens 2; pistil with a distinct style and two long plumose stigmas. Perennials with flat linear blades and 2-several digitate or approximate racemes.

TYPE SPECIES: *Sclerandrium truncatiglume* (F. Muell. ex Benth.) Stapf & C. E. Hubb. (*Ischaemum truncatiglume* F. Muell. ex Benth.).

1. *Sclerandrium truncatiglume* (F. Muell. ex Benth.) Stapf & C. E. Hubb., *Hook. Ic.* 33: *pl.* 3262. 1935; Chase, *Jour. Arnold Arb.* 20: 314. 1939.

Ischaemum truncatiglume F. Muell. ex Benth., *Fl. Austral.* 7: 518. 1878. Type from Australia.

Culms caespitose, 3-5-noded, 80-150 cm. tall, glabrous; sheaths firm, shorter than the internodes, glabrous or slightly pilose in the throat; ligule membranous, about 1 mm. long; blades as much as 50 cm. long, 5-10 mm. wide, acuminate, the base attenuate, the upper surface sparsely pilose toward the base, otherwise glabrous; racemes 3-6, erect, 8-12 cm. long, the common axis about 1.5 cm. long; rachis slender, pilose, the internodes about 3 mm. long; sessile spikelets 5-6.5 mm. long; first glume 3.5-5 mm. long, truncate to 2-3-toothed, smooth and shining on the back, ciliate with white hairs 1-2 mm. long on the margins and apex, inside 5-7-nerved, the nerves anastomosing below the apex; second glume short-appressed-pilose, the hairs longer on the margins and toward the apex; lower lemma lanceolate, 4-5 mm. long, the palea similar but slightly wider, both more or less pubescent; upper lemma slightly shorter than the fertile, the apex bearing an awn up to 3 mm. long, the lemma and slightly longer palea more or less pubescent; pediceled spikelet 3-3.6 mm. long, the slender pilose pedicel about 2 mm. long, the spikelet disarticulating obliquely with a sharp-pointed brown hairy callus; glumes brown, pilose, with spreading whitish hairs about 1 mm. long; fertile lemma with an awn 16-25 mm. long, the column 5-9 mm. long, spreading-pilose with white hairs about 1 mm. long.

BRITISH NEW GUINEA: Western Division: Tarara, Wassi Kussa River,

Brass 8537 (A, US) (uncommon on savannah-forest ridges), *Brass* 8665 (A, US) (occasional on banks of streams in savannah forest).
Australia and New Guinea.

32. *Ischaemum* L.

Ischaemum L., Sp. Pl. 1049. 1753, Gen. Pl. ed. 5. 469. 1754.

Meoschium Beauv., Ess. Agrost. 111. *pl.* 21, *fig.* 4. 1812.

Spikelets paired, one sessile or subsessile and perfect, falling with the rachis joint and the pedicel of the upper spikelet, the other pediceled, staminate or perfect, falling free from the pedicel; rachis joints and pedicels trigonous or rarely convex on the back, usually ciliate along the edges; glumes firmly indurate, the first flat or slightly rounded on the back, the margins inflexed; second glume cymbiform, keeled on the back or rarely rounded, the apex acuminate or aristate; sterile lemma membranous or hyaline, enclosing a palea and a staminate flower; upper floret perfect or pistillate, the lemma hyaline, usually 2-cleft and awned from the base of the cleft; first glume of the pediceled spikelet often with one margin strongly inflexed, the glume thus appearing laterally compressed. Annuals or perennials with usually binate or digitate (rarely solitary) racemes.

TYPE SPECIES: *Ischaemum muticum* L.

KEY TO THE SPECIES

1. Racemes solitary or binate.
2. Racemes binate, often closely appressed and appearing as a solitary cylindrical spike; rachis joints and pedicels trigonous.
3. Culms prostrate, creeping; fertile lemma mucronate or with a short straight (3 mm. long or less) awn from the apex.....3. *I. muticum*.
3. Culms erect or ascending; fertile lemma deeply cleft and bearing a geniculate and twisted awn from the base of the cleft.
4. Plants 60-150 cm. tall; first glume of pediceled spikelet acute or bifid, not aristate.
5. Sessile spikelet (including the callus) 7-9 mm. long; rachis joints about 5 mm. long; first glume stramineous or brownish.....1. *I. aristatum*.
5. Sessile spikelet (including the callus) about 6 mm. long; rachis joints about 4 mm. long; first glume purple-flecked.....2. *I. pubescens*.
4. Plants 20-40 cm. tall; both glumes of pediceled spikelet aristate; callus yellow-bearded.
6. Second glume of the sessile spikelet with an awn 5-6 mm. long; glumes of the pediceled spikelets long-pilose on the keels, aristate, the awns 3-4 mm. long.....4. *I. foliosum*.
6. Second glume of the sessile spikelet with an awn only 1-2 mm. long; glumes of the pediceled spikelets scabrous on the keels, short-aristate, the awns only 0.5-1 mm. long.....5. *I. littorale*.
2. Racemes solitary; rachis joints and pedicels hemispheric-convex on the back, the inner cavity closed by a thin hyaline membrane.....9. *I. fragile*.
1. Racemes 3-7, digitate or approximate.
7. Sessile spikelet with a well developed geniculate and twisted awn; first glume stramineous or brownish.
8. Sessile spikelet with a geniculate awn; pediceled spikelet mucronate or with a short straight awn.....7. *I. digitatum*.

8. Both sessile and pediceled spikelets with well developed geniculate awns....
8. *I. intermedium*.
 7. Sessile spikelet with a straight awn 5–6 mm. long; pediceled spikelet awnless;
 first glume purple-flecked.....6. *I. Turneri*.

1. *Ischaemum aristatum* L., Sp. Pl. 1049. 1753; Blatter & McCann, Imp. Council Agric. Res. Sci. Monogr. 5: 11–12, *pl.* 6. 1935; Hitchc., Brittonia 2: 126. 1936. Type from China.

Ischaemum arundinaceum F. Muell. ex Benth., Fl. Austral. 7: 519. 1878; Chase, Jour. Arnold Arb. 20: 313. 1939. Type from Australia.

Culms erect or decumbent at base, 60–150 (sometimes to 200) cm. tall, stout or rather slender, the internodes often pruinose; nodes glabrous or bearded; sheaths keeled above, usually glabrous, the margins extending into auricles 3–6 mm. long connected by the membranous, often somewhat shorter ligule; blades linear-lanceolate, 10–30 cm. long, 8–15 (rarely to 20) mm. wide, acuminate, the base sometimes rounded or subcordate but more often gradually tapering, usually glabrous on both surfaces (rarely somewhat pubescent), the margins scabrous; racemes 2, erect, usually closely appressed and appearing more or less as one cylindrical spike, 5–15 cm. long; rachis joints about 5 mm. long, 3-angled and ciliate on the angles; pedicels somewhat shorter, similar to the rachis joint and parallel to it; sessile spikelets stramineous or brownish, oblong, 7–9 mm. long including the bearded callus; first glume nearly smooth to more or less prominently rugose below, striate above, the keels winged; fertile lemma cleft to the middle and bearing from the base of the cleft a twisted and geniculate awn 10–15 mm. long; pediceled spikelets slightly shorter, usually broadly winged along the external keel, awnless.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass* 5726 (GH, US) (common amongst bushy growth on fringe of forest); Lake Daviumbu, Middle Fly River, *Brass* 7900 (A, US) (dominating [often the only grass] over large areas of low savannah and wet grass plains); Lower Fly River, *Brass* 8259 (A, US) (common in savannah forests); Tarara, Wassi Kussa River, *Brass* 8751 (A, US) (not common in savannah forests).

India to China, the Philippines, Malaysia, New Guinea, to Australia.

Typical *Ischaemum aristatum* from China has the lower part of the first glume prominently transversely rugose or at least with rather prominent marginal undulations. In *I. arundinaceum* from Australia the first glume is smooth or with only weak undulations on the margins. In all other respects these two species are practically indistinguishable. Since there is no other character on which to separate these “species” except the presence or absence of undulations on the first glume, and in that it seems to be a matter only of degree, they are considered here to be components of one variable species. The New Guinea material varies from having the first glume smooth to rather noticeably undulate.

1a. *Ischaemum aristatum* L. subsp. *barbatum* (Retz.) Hack. in DC., Monogr. Phan. 6: 204. 1889; Chase, Jour. Arnold Arb. 20: 314. 1939.

Ischaemum barbatum Retz., Obs. Bot. 6: 35 [error for 25]. 1791. Type from Java.

Differing from the species in having sessile spikelets more or less dorsally villous, and pediceled spikelets glabrous or villous. The sheaths are often pilose.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass* 5928 (A, US) (forming large patches on open slopes); Gaima, Lower

Fly River, *Brass* 8260 (A, US) (occasional in savannah forest grass cover); Daru Island, *Brass* 6040 (GH, US) (very abundant on wet savannahs of center of Island), *Brass* 6253 (A, US) (frequent in tall grass cover of savannah forests). NETHERLANDS NEW GUINEA: Hollandia and vicinity, alt. 20–100 m., *Brass* 8815 (A, US) (covering extensive deforested slopes in association with *Gleichenia* sp. or in pure stands).

Indo-Malayan region to New Guinea.

This subspecies is distinguishable on no other character than the pilose first glume. I suspect that this is not reliable and that plants may be pilose when young and become glabrous in age. *Ischaemum barbatum* Retz. var. *arfakense* (Rendle) Ohwi (56, p. 11) is probably this subspecies. *Brass* 6040 has exceptionally hairy sheaths and was reported as *I. aristatum* var. *Meyenianum* (Nees) A. Camus, by Hitchcock (35, p. 126). *Brass* 8260 was reported as *I. pubescens* by Chase (17, p. 314).

2. *Ischaemum pubescens* Merr., Philip. Jour. Sci. Bot. 9: 264. 1914. Type from the Philippines.

Perennial; culms glabrous, pruinose below the nodes, 70–100 cm. tall, the nodes bearded; sheaths rather loose, the lower softly pilose, the upper more or less glabrous, the margins extending into auricles 2–3 mm. long connected by the brown hyaline ligule; blades softly pilose on both surfaces, the margins scabrous, 10–18 cm. long, 6–12 mm. wide, acuminate, the base of the upper rounded, of the lower gradually narrowed; racemes 2, closely appressed, 6–10 cm. long, long-exserted; rachis joints about 4 mm. long, 3-angled, ciliate-pilose on the angles; pedicels similar, about 3 mm. long; sessile spikelets oblong, about 6 mm. long including the callus, 1.8 mm. wide, the callus white-bearded; first glume indurate, the base with two obscure undulations, the upper half winged, the wings serrulate-scabrous, the back purple-flecked and usually bearing a few scattered hairs; second glume keeled on the back, indurate like the first; lemmas hyaline, the sterile entire, the fertile cleft to the middle and bearing in the cleft a geniculate twisted awn 8–13 mm. long; pediceled spikelets of about the same size and color as the sessile, the first glume sparingly pilose on the back, broadly winged on one side, the wing serrulate scabrous.

NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass* 11617 (A, US) (one of the most abundant grasses on deforested slopes), *Brass* 11732 (A, US) (very abundant, sometimes dominant on sandy soil of deforested slopes).

Philippines, New Guinea.

Closely allied to *Ischaemum aristatum* L. subsp. *barbatum* (Retz.) Hack. but distinguishable by its smaller spikelets with the first glume purplish-flecked rather than stramineous, the shorter rachis joints, and the pilose blades.

3. *Ischaemum muticum* L., Sp. Pl. 1049. 1753; K. Schum., Bot. Jahrb. 9: 197. 1887; Hack. in DC., Monogr. Phan. 6: 212. 1889. Type from India.

Perennial; culms long-prostrate, glabrous and often pruinose, the ascending flowering branches 15–50 cm. tall; upper sheaths overlapping, the lower shorter than the internodes, glabrous to more or less papillose-villous toward the margins; ligule membranous, truncate, glabrous or ciliolate, 0.5–1 mm. long; blades linear-lanceolate to lanceolate, 6–12 cm. long, 5–15 mm. wide, the base cordate and with a petiole about 1 mm. long; racemes 2, usually partly included in the upper sheaths, 2.5–4 cm. long;

rachis joints 3-angled, stout, about half as long as the sessile spikelet, the angles glabrous, scabrous, or sometimes short ciliate; pedicels about as long as the rachis joint, similar but usually slightly more slender; sessile spikelet glabrous, smooth and shining, 7–9 mm. long including the 1.5–2 mm. long callus; glumes firmly indurate, the first obovate-lanceolate, the apex acute or shortly bidentate, the keels on the upper half with broad membranous wings; second glume prominently wing-keeled, acute or shortly aristate; sterile lemma chartaceous, the margins with a hyaline wing toward the apex, the palea of like texture but slightly longer; fertile lemma membranous, mucronate or with an awn as much as 3 mm. long, the palea of like texture; pediceled spikelet about 6 mm. long, perfect or rarely sterile.

BRITISH NEW GUINEA: Central Division: Hula, *Brass* 514 (GH, US) (a sand binding grass; just above tide mark); Hisiu, *Carr* 11413 (NY) (sandy beach); Eastern Division: Bomgwina, *Brass* 1616 (GH, US) (common beach grass); Gulf Division: Vailala, *Brass* 1177 (GH, US) (very common on the beaches); Western Division: Coast between Oriomo and Fly Rivers, *Brass* 6410 (A, US) (abundant as a sand binder on beaches). NORTHEAST NEW GUINEA: Morobe District: Finschhafen, *Weinland* 347 (US). NEW BRITAIN: *R. Parkinson* 47 (US); Rabaul, *Herre* 185 (NY) (seashore). SOLOMON ISLANDS: San Cristoval: Waimamura, *Brass* 2646 (GH) (on cleared land near the sea, abundant).

India to Australia, New Guinea and many Pacific Islands.

4. *Ischaemum foliosum* Hack. in DC., *Monogr. Phan.* 6: 222. 1889. Habitat in New Ireland and New Caledonia.

Ischaemum murinum var. *spiculis majoribus* Balansa, *Bull. Soc. Bot. France* 19: 323. 1872. Habitat in New Caledonia.

Culms rather slender, ascending from creeping bases, 20–30 cm. tall, the nodes bearded with ascending white hairs 3–5 mm. long; sheaths longer than the internodes, slightly keeled above, toward the margins papillose-pilose with white hairs 4–5 mm. long; ligule membranous, ciliate, 0.5–1 mm. long; blades linear to sublanceolate-linear, 4–8 cm. long, 4–7 mm. wide, acuminate, narrowed toward the base, glabrous below, the upper surface somewhat glaucous and papillose-pilose toward the base; racemes binate, about 3 cm. long; rachis joints and pedicels trigonous, rather stout, 2.5–3 mm. long, the angles ciliate with yellow hairs 2–3 mm. long, the callus densely bearded with similar hairs; sessile spikelet lanceolate, about 6 mm. long including the callus; first glume acuminate, bimucronate, the basal part glabrous, the upper two-thirds scabrous, the narrow keel wings ciliolate-scabrous; second glume equal to the first, somewhat rounded on the back, bidentate, bearing from between the teeth an awn 5–6 mm. long; sterile lemma slightly shorter than the glumes; fertile lemma bifid, the teeth 1–1.5 mm. long, awn 18–20 mm. long, the column about 6 mm. long; pediceled spikelet with both glumes long-pilose on the keels, aristate, the awn 3–4 mm. long; awn of the upper lemma like that of the sessile spikelet.

New Ireland to New Caledonia.

The only specimen seen was a duplicate of the second specimen cited in the original description (*Balansa* 707).¹⁹ The description was drawn up

¹⁹ Specimen from the Hackel Herbarium in Vienna now deposited in the United States National Herbarium.

from this plant and from Hackel's original description. Included in this paper since the first cited specimen was from New Ireland.

5. *Ischaemum littorale* sp. nov. PLATE VII. Figs. a-c.

Perennis 20–40 cm. alta; culmis glabris, caespitosis, erectis vel ascendentibus; nodis supra albo-barbatis, inferne demum glabratis; vaginis supra carinatis, quam internodiis plerumque longioribus, papilloso-pilosis, pilis laxis et longis; ligula membranacea, ciliolata, circiter 1 mm. longa; laminis planis vel plus minusve involutis, 3–8 cm. longis, 2–4 mm. latis, acuminatis, basin versus leviter angustatis, subtus scabris, supra papilloso-pilosis, pilis albis, laxis, marginibus glabris vel apicem versus scabris; racemis binatis, longe exsertis, 2–4 cm. longis; articulis pedicellisque subaequalibus, trigonis, 2.5–3 mm. longis, utroque latere circiter 0.5 mm. lata, angulis exterioribus dense ciliatis, pilis luteis circiter 1 mm. longis; spicula sessili straminea vel fulva, callo 1 mm. longo incluso circiter 5 mm. longa; glumis subaequalibus gluma prima anguste lanceolata, apice acuminata, bifida, carinata anguste alata, dorso plana, glabra, inferne levi, superne scaberula, praeter carinas 2–3-nervia; gluma secunda dorso inferne convexa, superne carinata, carina scaberrima, alioquin glabra levi, infra apicem minute bidentatum aristulam 1–2 mm. longam exserente; lemmate sterili 3-nervio, quam glumis paullo brevior, palea quam lemmate paullo brevior, antheris circiter 2 mm. longis; lemmate fertili quam lemmate sterili paullo brevior, in $\frac{1}{2}$ superiore bifido, arista 15–20 mm. longa, columna fusca circiter 5 mm. longa; stigmatibus circiter 3 mm. longis, staminibus abortivis; spicula pedicellata lanceolata, glumis aequalibus vel subaequalibus, acuminatis, mucronatis vel aristatis, arista ad 1 mm. longa.

SOLOMON ISLANDS: San Cristoval: Waimamura, Brass 2593 (GH, TYPE), August 5, 1932 (among coral rocks just above high water mark, common), Brass 2813bis (GH).

Ischaemum littorale is of the alliance of *I. foliosum*, from which it differs in having narrower blades, which are papillose-pilose above rather than glabrous, more slender rachis joints and pedicels, which bear shorter hairs on the outer angles, and in the much shorter awn on the second glume of the sessile spikelet. A further difference is seen in the pediceled spikelets, which have glumes bearing awns only up to 1 mm. long rather than 3–4 mm. long as in *I. foliosum*.

Comparison may also be made with *Ischaemum aureum* (Nees) Hack., but that species has glabrous nodes and sheaths, blades which are glabrous or only sparsely pilose at the base and on the margins, larger spikelets in which the second glume bears an awn about twice as long as that of *I. littorale*, and glumes of the pediceled spikelets long-ciliate on the keels.

6. *Ischaemum Turneri* Hack. in DC., Monogr. Phan. 6: 232. 1889; K. Schum., Notizbl. Bot. Gart. Berlin 1: 206. 1896. Type from New Ireland.

Sheaths glabrous, shorter than the internodes; ligule glabrous with a row of hairs in back of it; blades 10–15 cm. long, 12–18 mm. wide, more or less rigid, at first clothed with appressed hairs, becoming glabrous, the margins scabrous; racemes 3–4, 4–7 cm. long; rachis joints and pedicels about equal or the pedicel slightly longer, both trigonous, stout, ciliate on

the interior angles, somewhat bowed out at the base and slightly excavated within, leaving a small oblong opening between them; sessile spikelet 8–9 mm. long including the 1.8 mm. long glabrous callus; first glume purple-flecked on the back, narrowly winged on the upper half, the wings ciliolate-scabrous, the apex acuminate, entire; second glume equal to the first, rounded on the back and with a narrowly winged keel toward the apex; fertile lemma with a straight awn 5–6 mm. long; pediceled spikelet about 7 mm. long, similar to the sessile but the fertile lemma only mucronate, not awned.

NEW IRELAND: *Turner* (fragment of the TYPE specimen consisting of three rachis joints with three sessile and two pediceled spikelets attached) ²⁰ (US).

New Britain, New Ireland, and New Caledonia.

No specimen was seen other than the small fragment cited. The description is a modification of the original by Hackel. Unfortunately Hackel was unable to give the height of the plant or any indication of its habit, since his description was based on a fragmentary specimen.

7. *Ischaemum digitatum* Brongn. in Duperry, Bot. Voy. Coquille 2: 70. *pl.* 13. 1831; Hack., Bot. Jahrb. 6: 238. 1885, in DC., Monogr. Phan. 6: 233. 1889. Type from the Moluccas.

Culms glabrous, ascending from a decumbent base, as much as 2 meters tall; the nodes sometimes sparsely bearded; sheaths keeled at least above, rather loose, glabrous or sparsely pilose; ligule membranous, 2–3 mm. long; blades linear-lanceolate, 15–30 cm. long, 6–15 (rarely to 20) mm. wide, glabrous, the margins scabrous; racemes 4–7 (rarely only 3), 5–8 cm. long; rachis joints and pedicels about equal, trigonous, the angles scabrous or short-ciliate, about 4 mm. long, bowed out equally at the base and slightly excavated within leaving a round or oblong opening between them; sessile spikelet 5–7 mm. long including the 1.5 mm. callus, 1.5 mm. wide, first glume smooth and shining below, the upper two-thirds striate, scabrous, the apex bidentate, the keels winged; second glume rounded on the back, narrowly wing-keeled toward the apex; sterile lemma as long as the glumes, acuminate; fertile lemma deeply cleft and bearing a geniculate twisted awn from the base of the cleft, the awn bent below the middle; pediceled spikelets similar but the fertile lemma entire or only slightly cleft, the awn short, not geniculate.

BRITISH NEW GUINEA: Central Division: Veiya, *Carr 11736* (NY) (river bank in the open); Western Division: Lake Daviumbu, Middle Fly River, *Brass 7528* (A, US) (savannahs; dominant grass of swamp margins); Daru Island, *Brass 6339* (A, US) (gregarious and dominant over a small wet-season swamp in savannah forest). NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. 2200 m., *Brass 11385* (A, US) (covering the moister parts of old garden clearings); Balim River, alt. 1600 m., *Brass 11806* (A, US) (dominant grass on formerly cultivated river flats).

Malaysia to Polynesia.

7a. *Ischaemum digitatum* Brongn. var. *polystachyum* (Presl) Hack. in DC., Monogr. Phan. 6: 233. 1889.

Ischaemum polystachyum Presl, Rel. Haenk. 1: 328. 1830. Type from the Marianas.

Differing from the species in having prominently bearded nodes, the ²⁰ Fragment from the Berlin Herbarium, with no precise locality, collector's number, or date. The specimen was labeled "*Ischaemum Turneri*" in Hackel's hand.

sheaths densely pilose and the rachis joints and pedicels ciliate with long stiff hairs on the outer angles.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1900 m., *Brass* 4808 (US) (a few plants in small grassland swamps); Mafulu, alt. 1250 m., *Brass* 5532 (GH, US) (common in regrowth brush on old garden lands); Gulf Division: Kerema, *Brass* 1213 (GH, US) (open grassland near the coast); Northern Division: About 1 mile north of East Embi Lake, *Reeder* 845 (A, US) (not common, low ground of grassland). NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, *Brass* 13721 (A, US) (occasional in rain-forest seral growths on sandy flood banks). NEW BRITAIN: Talasea, near Waru village, alt. 200 m., *Burcham* 140 (US) (sandy loam soil under coconut trees, abundant in this locality).

The Marianas to Malaysia and New Guinea.

Hitchcock (35, p. 126) reported *Brass* 4808 and 5532 as *Ischaemum ciliare* Retz., but the second specimen is certainly *I. digitatum*. The identity of the other (*Brass* 4808) cannot be certain, since the plant is infected with a fungus and appears to be abnormal. The specimen is like *I. ciliare* in having only two racemes, but in that species both the pediceled and sessile spikelet have well developed geniculate awns. The *Brass* specimen has a well developed geniculate awn on the sessile spikelet, but the pediceled spikelet has only a short straight awn. Since the spikelets are those of *I. digitatum*, it seems best to refer the specimen to this species, especially since *I. ciliare* is not otherwise known from New Guinea.

8. *Ischaemum intermedium* Brongn. in Duperry, Bot. Voy. Coquille 73. 1831; Hack., Bot. Jahrb. 13: 261. 1891. Type from the Carolines.

Similar to *I. digitatum* in having 4–6 racemes, but a somewhat smaller species, in which the sessile spikelets have the apex of the first glume acuminate and entire rather than bifid. Both the sessile and pediceled spikelets have a well developed geniculate awn, although that of the sessile spikelet is often larger.

The Carolines to the Moluccas and New Guinea. Also in the Philippines.

Reported from New Guinea, but I have seen no specimen which could be distinguished from *I. digitatum*.

9. *Ischaemum fragile* R. Br., Prodr. Fl. Nov. Holl. 1: 205. 1810; C. E. Hubb., Hook. Ic. 33: pl. 3263. 1935; Hitchc., Brittonia 2: 127. 1936. Type from Australia.

Digastrium fragile (R. Br.) A. Camus, Bull. Soc. Bot. France 70: 850. 1923.

Perennial; culms glabrous, 40–110 cm. long, erect or ascending from a geniculate base, 3–7-noded, the nodes often bearded; sheaths keeled, glabrous to more or less pilose; ligule membranous, 2–3 mm. long, tapering to the obtuse, often ciliate apex; blades flat, linear, as much as 20 cm. long, 3–7 mm. wide, acuminate, the base long-attenuate, both surfaces glabrous to more or less densely pubescent, the margins usually scabrous; racemes solitary, 4–6 cm. long, long-exserted when mature; joints of the rachis and pedicels about equal, the pedicel slightly narrower, 3.5–4 mm. long, hemispheric-convex on the back, the inner cavity closed by a thin hyaline membrane, the margins and often the dorsal mid-line pilose; sessile spikelet 5–6 mm. long including the densely bearded callus; first glume emarginate, the upper part with two prominent wings, the lower half smooth and shining, the upper striate; second glume with a short

wing on the upper part of the keel, the apex with an awn 1–3 mm. long; sterile lemma hyaline, its palea firmer and enclosing a staminate flower; fertile lemma deeply cleft and bearing a twisted and geniculate awn from the base of the cleft, the awn 10–18 mm. long; pediceled spikelets reduced, smaller than the sessile, bearing a staminate flower or sometimes reduced to the glumes.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass* 5961 (US) (rare on damp soil on open ridges); Mabaduan, *Brass* 6486 (A, US) (common in primary savannah-forest grass cover; most abundant in old garden lands); Lake Daviumbu, Middle Fly River, *Brass* 7874 (A, US) (rare on savannahs of this locality), *Brass* 7934 (A, US) (rare grass on wet savannahs).

Australia and New Guinea.

33. *Apluda* L.

Apluda L., Sp. Pl. 82. 1753, Gen. Pl. ed. 5. 35. 1754 (non Beauv. 1812).

Calamina Beauv., Ess. Agrost. 128. pl. 23, fig. 1. 1812.

Racemes solitary at the ends of the branches of a leafy open paniculate inflorescence, each partly enclosed in a swollen bract or spathe, reduced to one joint bearing three spikelets, one sessile and perfect, the others borne on flattened glume-like pedicels, one of the pediceled spikelets reduced to a minute flattened glume, the other staminate or neuter (rarely perfect) and as large as the sessile one; sessile spikelet with a thickened rounded callus, the first glume indurated, obtuse, rounded on the back, the margins somewhat inrolled; second glume membranous, gibbous below, the keel depressed above; lower floret staminate, the lemma hyaline, about as long as the glumes, the palea nearly as long, 2-nerved; upper floret perfect, the lemma gibbous on the back, 1-nerved, awnless or short-awned, the palea about half as long; pediceled spikelet similar but both glumes somewhat indurate and the tip of the second glume not depressed. A straggling much branched perennial.

TYPE AND ONLY SPECIES: *Apluda mutica* L.

1. *Apluda mutica* L., Sp. Pl. 82. 1753; F. Muell., Pap. Pl. 1: 46. 1876. Type from India.

Apluda varia Hack. subsp. *mutica* Hack. in DC., Monogr. Phan. 6: 197. 1889.

Culms glabrous, 1–2 meters long, wiry, weak and straggling, decumbent at base, geniculately ascending, usually leaning on other vegetation; sheaths glabrous, usually shorter than the internodes; ligule membranous, 1–2 mm. long; blades scabrous, linear, 10–40 cm. long, 3–10 (rarely to 15) mm. wide, acuminate, the apex often setaceous, the base gradually narrowed into a short petiole; inflorescence narrow, often zig-zag, the axis very slender; spikelets 3–4 mm. long, these and the cymbiform spathes often pruinose.

BRITISH NEW GUINEA: Central Division: Hula, *Brass* 522 (GH, US) (damp hollows in coast sandhills); Roana, Laloki River, alt. 450 m., *Brass* 3613 (A, US) (rocky savannahs, not plentiful); Mafulu, alt. 1250 m., *Brass* 5403 (GH, US) (common, straggling amongst tall *Imperata* on artificial grass slopes); Veiya, *Carr* 11741 (NY) (open country); Port Moresby, *MacFarlane* 48 (US), *C. T. White* 30 (US); Northern Division: Ambasi, *King* 1018 (US); about 9 miles northwest of Oro Bay, *Reeder* 819 (A, US) (common in grassland); Western Division: Dagwa, Oriomo River, alt. 40 m., *Brass* 5957 (GH, US) (growing amongst coarse grasses on an old garden site on open savannah); Daru Island, *Brass*

6431 (A, US) (rare in savannah forests); Lake Daviumbu, Middle Fly River, *Brass* 7771 (A, US) (few plants in old village clearing); Goodenough Island: Haiwali, alt. 30 m., *Burcham* 119 (US) (two miles inland on coastal plain, grassy clearing in rain forest). NORTHEAST NEW GUINEA: Morobe District: Finschhafen, *Warburg* 20968 (A), *Weinland* 290 (US); near Kajabit Mission, alt. about 500 m., *Clemens* 10631 (US). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass* 11798 (A, US) (plentiful subsidiary grass on deforested slopes).

India to China, Formosa, the Philippines, Malaysia, New Guinea, and New Caledonia.

34. *Hackelochloa* Kuntze

Hackelochloa Kuntze, *Rev. Gen.* 2: 776. 1891.

Manisuris L. f., *Nov. Gram. Gen.* 37. 1779 (non L., *Mant.* 2: 164. 1771).

Ryttilix Raf., *Bull. Bot. Seringe* 1: 219. 1830.^{20a}

Spikelets in pairs, dimorphic, awnless, one sessile and perfect, the other pediceled, staminate or neuter; rachis fragile, readily disarticulating, the joints and pedicels firmly grown together, the two clasped between the edges of the coriaceous, subhemispheric, foveolate first glume of the sessile spikelet; second glume chartaceous and set in a cavity in the slightly hollowed out fused rachis joint and pedicel and more or less adnate to it; lemmas hyaline, the lower empty, the upper perfect; pediceled spikelets conspicuous, ovate, the glumes membranous, green. Annuals with freely branching culms, flat blades, and numerous solitary spikelike racemes borne on the ends of slender fascicled spatheate branches.

TYPE SPECIES: *Hackelochloa granularis* (L.) Kuntze (*Cenchrus granularis* L.).

1. *Hackelochloa granularis* (L.) Kuntze, *Rev. Gen.* 2: 776. 1891; Hitchc., U. S. Dept. Agric. Misc. Publ. 200: 764. *fig. 1689*. 1935, *Brittonia* 2: 127. 1936. *Cenchrus granularis* L., *Mant.* 2: 575. 1771. Type from India.

Manisuris granularis (L.) L.f., *Nov. Gram. Gen.* 40. *pl. 1, fig. 4-7*. 1779; Swartz, *Prodr. Veg. Ind. Occ.* 25. 1788; Beauv., *Ess. Agrost. pl. 21, fig. 10*. 1812; K. Schum., *Notizbl. Bot. Gart. Berlin* 2: 90. 1898.

Culms more or less decumbent, 20-100 cm. tall, glabrous or sparsely hispid; sheaths rather loose, keeled, papillose-hispid; blades lanceolate-linear, flat, papillose-hispid like the sheaths, 5-15 cm. long, the base more or less cordate; racemes 1-2.5 cm. long, borne on slender peduncles, shortly exserted or the base included in the spathe; sessile spikelets 1-1.5 mm. long, equaling or a little longer than the rachis joints, the pediceled spikelets 1.5-2 mm. long.

BRITISH NEW GUINEA: Central Division: Baroka, Nakeo District, alt. 50 m., *Brass* 3701 (A, US) (common in shelter of taller savannah forest); Northern Division: About 8 miles northwest of Oro Bay, *Reeder* 806 (A, US) (sandy soil along old jeep road; apparently not common). NORTHEAST NEW GUINEA: Morobe District: *Clemens* 4307 (A); near Kajabit Mission, alt. 250-600 m., *Clemens* 40782 (US); Wantoat, alt. about 1000 m., *Clemens* 40867 (US).

Tropics of both hemispheres.

35. *Hemarthria* R. Br.

Hemarthria R. Br., *Prodr. Fl. Nov. Holl.* 1: 207. 1810.

Spikelets paired, 1-flowered, one sessile, the other pediceled, both alike

^{20a} Not effectively published. For details see Hitchcock, *Contr. U. S. Nat. Herb.* 24: 506. 1927, and U. S. Dept. Agric. Bull. 772 (revised): 286. 1936.

or the pediceled spikelets narrower and attenuate, the pedicels appressed to the rachis, usually adnate to it and forming with the hollowed-out rachis joint a cavity containing the sessile spikelet; rachis disarticulating tardily or not at all; first glume coriaceous, dorsally flattened, fitting over the hollow containing the spikelet; second glume cymbiform, membranous-hyaline, more or less adnate to the rachis joint; lemmas hyaline, the lower empty, the upper (fertile) awnless, usually with a small palea; pediceled spikelet acuminate or attenuate, both glumes coriaceous, the second usually longer than the first, free, the apex attenuate or awn-pointed. Perennials with mostly decumbent culms and terminal spikelike racemes solitary on the culms and branches.

TYPE SPECIES: *Hemarthria compressa* (L. f.) R. Br. (*Rottboellia compressa* L. f.).

1. *Hemarthria subulata* sp. nov. PLATE V, Figs. c-e.

Probabiliter perennis; culmis compressis glabris erectis, ramosis, 1-1.5 m. altis; nodis 4-6; vaginis glabris plus minusve laxis, supra quam internodiis brevioribus, eis infra medium culmi plerumque quam internodiis longioribus; ligula ciliata, circiter 1 mm. longa; laminis linearibus, laxis, ad 60 cm. longis, 2-4 mm. latis, utrinsecus glabris, marginibus scabris; racemis solitariis, gracilibus, 10-20 cm. longis, rhachi tenaci sed denique plus minusve disjuncta, articula infra spiculam longe acuminato-cuspidata; spicula sessili hermaphrodita, articula aequali vel paullo brevior; gluma prima indurata, acuta, 7-nervia; gluma secunda articula plus minusve adnata, membranaceo-scariosa; lemmatibus subaequalibus; lemmate sterili quam glumis circiter quarte parte brevior, palea sterili nulla; lemmate fertili quam lemmate sterili saepe paullo brevior, palea fertili quam lemmate quarta vel tertia parte brevior; staminibus 3, antheris circiter 4 mm. longis; spicula pedicellata acuminata, quam spicula sessili angustiore, ceterum simili, pedicellis articulis saepius laxiuscule adnatis rarius liberis, spicula sessili circiter aequali; glumis induratis, prima dorso complanata, secunda cymbiformi, carinata, carina anguste alata, ceterum spicula sessili simili.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass* 7552 (A, US, TYPE) August, 1936 (in savannahs, common on margins of swamps); Dagwa, Oriomo River, *Brass* 6001 (GH, US) (rare grass on a small marshy flat).

Apparently closely related to *Hemarthria protensa* Nees ex Steud., but differing in having stiffly erect rather than decumbent culms, much longer and narrower blades with scabrous margins, a disarticulating rachis, the first glume 7-nerved, and the fertile lemma well developed rather than obsolete or only about one-fourth the length of the spikelet. *Brass* 6001 was reported as *Manisuris protensa* (Nees ex Steud.) Hitchc. (*H. protensa* Nees ex Steud.) by Hitchcock (35, p. 127).

36. *Eremochloa* Buse

Eremochloa Buse in Miquel, Pl. Jungh. 1: 357. 1854.

Pectinaria Hack., Nat. Pflanzenfam. II. 2: 26. 1887.

Spikelets appearing solitary at each node, but actually paired, only the sessile developing, the pediceled reduced to a glume-like or stipiform

pedicel; sessile spikelets dorsally compressed, awnless, imbricate along one side of a tardily disarticulating rachis; glumes chartaceous, the first broad, flat or only slightly rounded on the back, the margins narrowly inflexed, 2-keeled, the keels spinulose or rigidly pectinate, at least on the lower part; second glume 3-nerved, the midnerve sometimes keeled; lemmas hyaline, the lower 3-nerved, triandrous, the palea similar; fertile lemma entire, usually nerveless, the palea similar but narrower. Slender perennials with solitary terminal racemes.

TYPE SPECIES: *Eremochloa Horneri* Buse = *E. ciliaris* (L.) Merr. (*Nardus ciliaris* L.).

KEY TO THE SPECIES

1. First glume wingless at summit, the marginal setae longer than the width of the glume.....1. *E. ciliaris*.
1. First glume with short narrow wings just below the summit, the marginal setae usually shorter than the width of the glume.....2. *E. bimaculata*.
1. *Eremochloa ciliaris* (L.) Merr., Philip. Jour. Sci. 1: Suppl. 331. 1906; Ohwi, Bot. Mag. (Tokyo) 56: 11. 1942.
Nardus ciliaris L., Sp. Pl. 53. 1753. Type from India.
India to China, the Philippines, and (?) New Guinea.
- 1a. *Eremochloa ciliaris* (L.) Merr. var. *elata* var. nov.

A typo culmis multo altioribus, laminis longioribus et rigidioribus arcte conduplicatis differt.

Culms erect, strongly flattened, 4-5-noded, glabrous to more or less pubescent, 75-110 cm. tall, branching from the middle and upper nodes; sheaths glabrous, shorter than the internodes, strongly keeled; ligule membranous, truncate, 0.5-1 mm. long; blades erect, firm, closely folded, as much as 25 cm. long, 3-6 mm. wide opened out; racemes 3-5 cm. long, straight or falcate; rachis joints clavate, about 2 mm. long, with a ring of short cilia at the base, otherwise glabrous; spikelets ovate, 4-5 mm. long; first glume glabrous or minutely pubescent, keels not winged, the setae more or less scabrous, longer than the width of the spikelet; sterile pedicel narrow, one-third to half as long as the spikelet.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, Brass 7808 (A, TYPE, US) Sept., 1936 (probably a rare glaucous form of the common 7849), Brass 7849 (A, US) (common on hummocks on wet grass plains).

Differs from the species in being much taller and having longer and firmer, closely folded blades.

2. *Eremochloa bimaculata* Hack. in DC., Monogr. Phan. 6: 265. 1889; Chase, Jour. Arnold Arb. 20: 314. 1939. Type from India.

Culms simple, slender, strongly flattened, tufted, 40-60 cm. tall, glabrous or sparsely pubescent; sheaths shorter than the internodes, rather densely papillose-pilose, the upper bearing reduced blades; ligule membranous, about 0.3 mm. long; blades 8-13 cm. long, 2-3 mm. wide, flat, flaccid, glabrous or more or less densely papillose-pilose; racemes 3.5-5 cm. long, the rachis undulate, the joints clavate, about half as long as the spikelets; spikelets ovate, 4-5 mm. long, the first glume glabrous or minutely pubescent on the back, the keels with short narrow brownish wings just below the apex, the setae widely spreading, mostly shorter than the width of

the glume; sterile pedicel about one-third shorter than the spikelet, abruptly acuminate, broadest in the middle.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, *Brass* 5743 (A, US) (common on grey soil of savannah ridges); Tarara, Wassi Kussa River, *Brass* 8408 (A, US) (common in savannah forests).

India to Australia and New Guinea.

The cited specimens differ from Hackel's original description in having the nodes glabrous or only slightly pubescent and the blades more or less densely papillose-pilose rather than glabrous. In other respects they agree well with both the description and a fragment of the type specimen (at US). The short narrow wings just below the tip of the first glume are distinctive. *Brass* 5743 was reported by Hitchcock (35, p. 127) as *Eremochloa ciliaris*, a closely related species having culms often branching from the upper and middle nodes and the first glume not winged.

37. *Elyonurus* Humb. & Bonpl. ex Willd.

Elyonurus Humb. & Bonpl. ex Willd., Sp. Pl. 4: 941. 1806.

Spikelets strongly dorsally flattened, awnless, in pairs, one sessile and perfect, the other pediceled, similar to the sessile or (in ours) much reduced, the pair falling attached to the rachis joint; rachis usually somewhat tardily disarticulating, breaking obliquely and forming a sharp-pointed callus; rachis joints and pedicels somewhat thickened, parallel, the rachis joint concave within and with the sessile spikelet appressed to it; first glume chartaceous to weakly coriaceous, dorsally flattened and with a line of balsam glands just inside the keels, the margins inflexed around the second glume, acute or acuminate, entire or bifid with aristate teeth; second glume chartaceous, weakly keeled on the back, the apex acuminate; lemmas hyaline, the palea much reduced or wanting. Erect moderately tall perennials with solitary, spikelike, often woolly racemes.

TYPE SPECIES: *Elyonurus tripsacoides* Humb. & Bonpl.

1. *Elyonurus citreus* (R. Br.) Munro ex Benth., Fl. Austral. 7: 510. 1878; White, Proc. Roy. Soc. Queensl. 34: 15. 1923; Hitchc., Proc. Linn. Soc. N. S. Wales 54: 145. 1929.

Andropogon citreus R. Br., Prodr. Fl. Nov. Holl. 1: 203. 1810. Type from Australia.

? *Elyonurus papuanus* Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 171. 1901. Type from Northeast New Guinea.

Culms tufted, glabrous, slender, 50–100 cm. tall, with floriferous branches from the upper one or two nodes; sheaths shorter than the internodes, glabrous to very sparsely pubescent, often more or less pilose in the throat; ligule ciliate, about 1 mm. long; blades 10–20 cm. long, involute, subfiliform, rigid, glabrous; racemes solitary on the culms and branches, 5–8 cm. long, silky-woolly from the spreading hairs on the rachis and pedicels; rachis joints 5–6 mm. long, the white hairs on the upper part 3–4 mm. long; pedicel about equal and with similar hairs; sessile spikelet 10–13 mm. long including the 2–3 mm. long, bearded callus; first glume very slightly convex on the back, glabrous or more or less pilose, the acuminate apex about as long as the body and split into two long flattened aristate teeth, the margins of the glume and the teeth pectinate with stiff hairs

as much as 1 mm. long; second glume about half as long as the first, keeled on the back, acuminate; pediceled spikelets shorter and narrower than the sessile, reduced to a pair of aristate empty glumes, the second about one-fourth shorter than the first, one margin of the first glume prominently pectinate, the other short-pectinate or merely scabrous.

BRITISH NEW GUINEA: Eastern Division: Kurandi, *Brass* 1397 (GH, US) (on old garden clearings); Western Division: Lake Daviumbu, Middle Fly River, *Brass* 7920 (A, US) (gregarious in small clumps on hard pebbly soil in savannahs).

Australia and New Guinea.

The type of *Elyonurus papuanus* has not been seen, but from the description it appears to be a synonym of *E. citreus*.

38. *Rottboellia* L.f.

Rottboellia L. f., Nov. Gram. Gen. 22. *pl.* 1. 1779 (non Scop. 1777). Nom. conserv. *Stegosia* Lour., Fl. Cochinch. 51. 1790.

Spikelets paired, awnless, one sessile and perfect, usually sunken in the cavities of the thickened articulate rachis, the other pediceled and staminate or sometimes rudimentary, the pedicels free or closely appressed to the rachis joints; joints of the rachis with a projection on the lower end fitting into a corresponding cavity in the upper end of the next lower joint; glumes coriaceous or chartaceo-membranous, the first dorsally convex or flattened, the second cymbiform, sometimes gibbous on the back; lemmas hyaline or thinly membranous, the lower staminate or neuter, the fertile 1-3-nerved and with a subequal palea. Annuals or perennials with usually stout readily disarticulating spikelike racemes solitary or fascicled in the axils of spatheate sheaths.

TYPE SPECIES: *Rottboellia exaltata* L. f.

KEY TO THE SPECIES

- 1. Pedicels flattened, very unlike the hollowed out rachis joint; sessile spikelets about 5 mm. long.....1. *R. exaltata*.
- 1. Pedicels similar to the rachis joints but slightly shorter, both subclavate; sessile spikelets 3-4 mm. long.....2. *R. rottboellioides*.
- 1. *Rottboellia exaltata* L. f., Nov. Gram. Gen. 22. *pl.* 1. 1779, Suppl. Pl. 114. 1781; Chase, Jour. Arnold Arb. 20: 314. 1939; C. E. Hubb. & Vaughan, Grass. Maurit. & Rodriguez 117. *fig.* 16. 1940. Type from India.
Manisuris exaltata (L. f.) Kuntze, Rev. Gen. 2: 779. 1891.
Stegosia exaltata (L. f.) Nash, N. Am. Fl. 17: 84. 1909.

Annual; culms erect, stout, branching, 60-200 cm. tall, glabrous or hispid below, often glaucous below the raceme; sheaths rather loose, usually densely papillose-hispid; ligule membranous, short-ciliate, about 1.5 mm. long; blades flat, linear-lanceolate, 15-50 cm. long, 5-25 mm. wide, often glaucous beneath, the margins serrulate-scabrous; racemes 8-15 cm. long, stout below and attenuate with imperfect spikelets above, scaberulous, often pale yellow except for the greenish first glume of the pediceled spikelets; joints of the rachis slightly longer than the sessile spikelets, hollowed out and the spikelet borne in the hollows; first glume about 5 mm. long, strongly indurated, emarginate, the second strongly gibbous

on the back; pediceled spikelet 3–4.5 mm. long, the pedicel somewhat flattened, about half as long as the rachis joint and closely appressed to it; first glume striate, green, obtuse or emarginate.

BRITISH NEW GUINEA: Western Division: Daru Island, *Brass* 6296 (A, US) (plentiful and forming dense brakes on wet garden land behind mangroves). Tropics of both hemispheres.

2. *Rottboellia rottboellioides* (R. Br.) comb. nov.

Ischaemum rottboellioides R. Br., Prodr. Fl. Nov. Holl. 1: 205. 1810. Type from Australia.

Andropogon rottboellioides (R. Br.) Steud., Syn. Pl. Glum. 1: 382. 1854.

Rottboellia ophiuroides Benth., Fl. Austral. 7: 514. 1878; K. Schum. & Hollr., Fl. Kais. Wilhelmsland 22. 1889. Based on *Ischaemum rottboellioides* R. Br.

Manisuris rottboellioides (R. Br.) Kuntze, Rev. Gen. 2: 779. 1891; Hitchc., Brittonia 2: 127. 1936.

Coelorachis rottboellioides (R. Br.) A. Camus, Ann. Soc. Linn. Lyon 68: 197. 1921.

Perennial; culms glabrous, subrobust, 1–2 meters tall; sheaths rather firm, glabrous or rarely somewhat short-pubescent, usually pubescent on the collar; ligule membranous, ciliate, 1–2 mm. long; blades 25–50 cm. long, 8–20 mm. wide, both surfaces glabrous (rarely more or less short pubescent), the margins serrulate-scabrous; racemes 6–8 cm. long, terminal on slender fascicled spatheate branches; joints of the rachis about one-fourth shorter than the sessile spikelets, subclavate, slightly keeled on the back, the inside somewhat concave; pedicels similar but slightly shorter, free from the rachis joint; sessile spikelet 3–4 mm. long; glumes coriaceous, glabrous, the first ovate-oblong, emarginate, the keels narrowly winged, often unequally so; second glume cymbiform, keeled on the back, the keel narrowly winged toward the apex; pediceled spikelets similar to the sessile, usually smaller, rarely as large or reduced to a pair of narrow glumes.

BRITISH NEW GUINEA: Central Division: Budotobara, *Brass* 776 (GH, US) (large savannah grass); Baroka, Nakeo District, alt. 50 m., *Brass* 3702 (GH, US) (scattered amongst the dominant *Anthistiria* [*Themeda*] on savannah forest ridges); Mafulu, alt. 1250 m., *Brass* 5310 (GH, US) (on artificial grasslands); Gosaro, Rigo District, *MacGregor* 19 (US); Western Division: Daru Island, *Brass* 6254 (A, US) (abundant in savannah forest and in some moist shaded situations the dominant grass); Gaima, Lower Fly River, *Brass* 8254 (A, US) (dominant grass on savannah forests); Northern Division: About 9 miles northwest of Oro Bay, *Reeder* 809 (A)²¹ (conspicuous constituent of the grassland); Goodenough Island: Haiwali village, *Burcham* 124 (US) (grassy clearing in rain-forest, appears to grow mainly in full sun). NORTHEAST NEW GUINEA: Morobe District: Four miles south of Langemak Bay, near Finschhafen, *Sawyer* 51 (A).

Australia and New Guinea.

39. *Thaumastochloa* C. E. Hubb.

Thaumastochloa C. E. Hubb., Hook. Ic. 34: pl. 3313, 3314. 1936.

Spikelets awnless, solitary at each node, all facing in the same direction; pediceled spikelets wanting or reduced to a minute glume, the pedicel firmly adnate to the rachis joint and forming with it a semicylindrical internode

²¹ This collection consists of a mixture, the specimen at the U. S. National Herbarium being *Ophiurus exaltatus*.

hollowed out within and with the first glume fitting tightly over the hollow containing the spikelet; racemes subcylindric-flattened, terminal, single or fascicled, consisting of 1 or 2 or a greater number of spikelets, these asymmetrical with the tips pointing in opposite directions, the peduncle gradually thickened upward and merging into the lowest rachis joint; first glume coriaceous, smooth or rugose on the back, the margins often inrolled; second glume cymbiform, membranous, 3–5-nerved; lemmas hyaline, the lower epaleate and empty; fertile lemma with a similar narrow palea and a perfect flower. Annuals or perennials with usually short slender somewhat flattened spikelike racemes and slender branching culms.

TYPE SPECIES: *Thaumastochloa pubescens* (Domin) C. E. Hubb. (*Ophiuros pubescens* Domin).

1. *Thaumastochloa rariflora* (F. M. Bailey) C. E. Hubb., Hook. Ic. 34: pl. 3313. 1936; Chase, Jour. Arnold Arb. 20: 314. 1939.

Rottboellia rariflora F. M. Bailey, Queensl. Dept. Agric. Bot. Bull. 8: 86. 1893. Type from Australia.

Annual; culms slender, geniculately ascending to erect, 10–60 cm. tall, the nodes pubescent to glabrous; sheaths much shorter than the internodes, keeled above, more or less densely pilose, the hairs often papillose-based; ligule membranous, ciliate, about 0.2 mm. long; blades flat or involute in drying, 2–10 cm. long, 2–4 mm. wide; racemes dorsally compressed, bearing one or two spikelets, solitary or fascicled and more or less included in the sheaths; peduncle 0.5–2.5 cm. long, the lower part tapering to a very slender base, becoming curved and readily disarticulating; rachis fragile, disarticulating horizontally, the 1 or 2 rachis joints smooth, glabrous, 2.5–3 mm. long, the upper terminating in a blunt apex scarcely exceeding the spikelet or in an acumen 1–6 mm. long; first glume dorsally flattened to slightly concave, granular-punctate, 9-nerved within, the margins minutely pubescent at the base; second glume 3–5-nerved, the upper margins very minutely ciliolate; remainder of the spikelet as in the generic description.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, alt. 30 m., Brass 6014 (GH, US) (uncommon on grey soil on savannah ridge); Mabaduan, Brass 6554 (A, US) (occasional under the dominant *Themeda triandra* in savannah forests).

Australia and New Guinea.

The cited specimens differ from Hubbard's description and illustration, and from the one Australian specimen seen, in having the apex of the upper rachis joint terminating in a blunt point rather than in an acumen 1–6 mm. long. In other respects they seem identical. Brass 6014 was cited as *Ophiuros pubescens* Domin [*Thaumastochloa pubescens* (Domin) C. E. Hubb.] by Hitchcock (35, p. 128), but in that species the raceme is composed of 4–9 spikelets in which the first glume is dorsally foveolate-tuberculate to transversely rugose.

40. *Ophiuros* Gaertn. f.

Ophiuros Gaertn. f., Suppl. Carpol. (Fruct. & Sem. 3) 3. pl. 181, fig. 3. 1805, pro parte.

Spikelets awnless, solitary at each node, distichous, the pediceled spike-

lets wanting, the pedicel firmly adnate to the rachis joint and forming with it a thick semi-cylindrical internode deeply hollowed out within, the first glume fitting tightly over the hollow containing the spikelet; first glume coriaceous, convex on the back and with a small groove at the base just above the narrow circular callus; second glume cymbiform, chartaceous; lemmas hyaline, as long as the spikelet, the first with a well developed palea and usually a staminate flower; fertile lemma with a similar palea and a perfect flower. Tall, coarse perennials with flat blades and smooth slender, spikelike, solitary racemes.

TYPE SPECIES: *Ophiuros corymbosus* (L. f.) Gaertn. f. = *O. exaltatus* (L.) Kuntze (*Aegilops exaltata* L.).

1. *Ophiuros exaltatus* (L.) Kuntze, Rev. Gen. 2: 780. 1891; Hitchc., Brittonia 2: 127. 1936.

Aegilops exaltata L., Mant. app. 575. 1771. Type from India.

Rottboellia corymbosa L. f., Suppl. Pl. 114. 1781. Type from India.

Ophiuros corymbosus (L. f.) Gaertn. f., Suppl. Carpol. (Fruct. & Sem. 3) 3-4. pl. 181, fig. 3B. 1805; Blatter & McCann, Imp. Council Agric. Res. Sci. Monogr. 5: 40. pl. 28. 1935.

Culms glabrous, subrobust, erect from more or less bulbous bases, 1-2 meters tall, with floriferous branches from the upper 2 or 3 nodes; lower sheaths glabrous, the upper often pilose on the margins and more or less dorsally papillose-hispid; blades linear to linear-lanceolate, as much as 60 cm. long, 8-25 mm. wide, rounded or subcordate at base, the margins often papillose-hispid; racemes 6-15 cm. long, about 1.5 mm. in diameter, solitary on slender fascicled branches, these more or less included in the sheaths of the upper leaves; rachis fragile, the joints about 3 mm. long, both ends obliquely truncate, the upper concave, the lower with a small projection which fits into the top of the joint below; first glume ovate-oblong, the dorsal surface smooth or more or less foveolate with 2-4 rows of small depressions, the remainder of the spikelet as in the generic description.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., Brass 3586 (GH, US) (fairly common in *Eucalyptus* savannahs); Baroka, Nakeo District, alt. 50 m., Brass 3724 (GH, US) (common in *Eucalyptus* savannah ridges); Kanosia, alt. about 30 m., Carr 11134 (NY) (open savannah land); Western Division: Wuroi, Oriomo River, alt. 10-30 m., Brass 5735 (GH, US) (scattered on savannah ridges); Mabaduan, Brass 6537 (A, US) (fairly common in grass cover of savannah forests); Lake Daviumbu, Middle Fly River, Brass 7643 (A, US) (open savannah); Northern Division: About 9 miles northwest of Oro Bay, Reeder 809 (US)²² (common constituent of the grassland). NORTHEAST NEW GUINEA: Morobe District: Markham Valley, Kajabit, Clemens 40838 (US); Finschhafen, Weinland 266 (US).

41. *Sorghum* Moench

Sorghum Moench, Meth. Pl. 207. 1794.

Holcus L., Sp. Pl. 1047. 1753, pro parte.

Spikelets in pairs or in threes at the ends of the branches, one sessile and fertile, the other pediceled, staminate or neuter, sometimes reduced to a single narrow glume; sessile spikelet dorsally compressed; glumes

²² This collection consists of a mixture, the specimen at the Arnold Arboretum being *Rottboellia rottboellioides*.

firmly coriaceous, the first rounded on the back or flattened, the margins involute, not keeled; second glume somewhat cymbiform but rounded on the back, not or only slightly keeled; lemmas hyaline or thinly membranous, the lower empty, the upper (fertile) oblong, bifid and awned from the sinus, or entire and awnless. Annuals or perennials with terminal panicles of numerous 1-5-jointed racemes.

TYPE SPECIES: *Sorghum saccharatum* (L.) Moench (*Holcus saccharatus* L. pro parte) = *Sorghum dochna* (Forsk.) Snowden.

KEY TO THE SPECIES

1. Panicle branches in whorls; pediceled spikelet staminate; hairs of the inflorescence brown.....1. *S. nitidum*.
1. Panicle branches solitary or in twos or threes; pediceled spikelet reduced to a narrow glume; hairs of the inflorescence white.....2. *S. laxiflorum*.
1. ***Sorghum nitidum*** (Vahl) Pers., Syn. Pl. 1: 101. 1805; Hitchc., Brittonia 2: 129. 1936.
Andropogon serratus Thunb., Fl. Jap. 41. 1784. Type from Japan.
Holcus nitidus Vahl, Symb. Bot. 2: 102. 1791. Type from India.
Holcus fulvus R. Br., Prodr. Fl. Nov. Holl. 1: 199. 1810. Type from Australia.
Sorghum fulvum (R. Br.) Beauv., Ess. Agrost. 164. 1812; White, Proc. Roy. Soc. Queensl. 34: 15. 1923.
Andropogon tropicus Spreng., Syst. Veg. 1: 287. 1825; Kunth, Rev. Gram. 1: pl. 97. 1829. Based on *Holcus fulvus* R. Br.
Sorghum tropicum (Spreng.) Buse in Miquel, Pl. Jungh. 359. 1854.
Sorghum serratum (Thunb.) Kuntze, Rev. Gen. 2: 792. 1891 (non Roem. & Schult. 1817).

Perennial; culms erect or ascending, 60-100 cm. tall, often decumbent, rooting and branching from the lower nodes; nodes densely bearded; sheaths mostly shorter than the internodes, glabrous or sometimes pubescent; ligule membranous, 1.5-2.5 mm. long, ciliolate; blades flat, linear, as much as 50 cm. long, 4-11 mm. wide, glabrous and smooth except for the scabrous margins; panicle oblong, 10-30 cm. long, the slender branches verticillate, naked below, simple and bearing a single terminal raceme (rarely the lower branches once or twice branched); racemes 1-2 cm. long, the rachis joints and pedicels ciliate with brown hairs, the pedicel shorter than the sessile spikelet, the rachis joint from equal to more than twice as long; sessile spikelet ovate to ovate-lanceolate, 3-4 mm. long, brownish or finally shining black, pubescent with brown hairs, awnless or with a twisted and geniculate awn 10-15 mm. long; pediceled spikelets staminate, of about the same size as the sessile, but the glumes membranous or chartaceous and lighter in color.

BRITISH NEW GUINEA: Central Division: Kanosia, Carr 11111 (US) (open savannah land); Carr 11135 (NY) (open savannah land); Roana, Laloki River, alt. 450 m., Brass 3629 (GH, US) (common species growing sporadically all through the savannahs); Western Division: Wuroi, Oriomo River, Brass 5895 (GH, US) (among *Imperata cylindrica* in savannah forest); Daru Island, Brass 6252 (A, US) (abundant in tall grass ground cover of savannah forest); Lake Daviumbu, Middle Fly River, Brass 7644 (A, US) (occasional in savannahs); Gaima, Lower Fly River, Brass 8263 (A, US) (common in savannah forest grass cover); Tarara, Wassi Kussa River, Brass 8567 (A, US) (savannah forest; associated with *Imperata* on well drained soils); Northern Division: About 9 miles northwest of Oro Bay, Reeder 808 (A, US) (common on grassland); Goodenough

Island: Haiwali village, *Burcham 121* (US) (grassy clearing in rain-forest). NORTHEAST NEW GUINEA: Morobe District: Kajabit Mission, *Clemens 10665* (US); Finschhafen, *Weinland 281* (US). NETHERLANDS NEW GUINEA: West of Hollandia, *Sigafoos 68* (A); Balim River, alt. 1600 m., *Brass 11618* (A, US) (one of principal grasses on sandy deforested slopes). NEW BRITAIN: *Parkinson 45* (US). India to Japan, Malaysia, and Australia.

All the cited specimens except *Brass 11618* and *Parkinson 45* are awnless. In the former, only part of the spikelets of the panicle are awned.

2. *Sorghum laxiflorum* F. M. Bailey, Rep. Exped. Bellenden. 70. 1889, Syn. Queensl. Fl. Suppl. 3: 84. 1890, Comp. Cat. Queensl. Pl. 620. fig. 595. 1909. Type from Australia.

Andropogon Baileyi F. Muell., Vict. Nat. 8: 16. 1891. Based on *Sorghum laxiflorum* F. M. Bailey.

Andropogon Sorghum (L.) Brot. subsp. *halepensis* (L.) Hack. var. *albovillosa* Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 173. 1901. Type from Northeast New Guinea.

Annual; culms weak, freely branching, decumbent below and rooting from the lower nodes, ascending to 1.5 meters, pubescent below the panicle, otherwise glabrous except for the short bearded nodes; sheaths mostly shorter than the internodes, more or less ciliate on the margins, otherwise glabrous; ligule membranous, about 1 mm. long, minutely ciliate; blades linear, rather firm, flat or folded, the margins sometimes revolute, as much as 70 cm. long, 4–10 mm. wide, the apex long-attenuate, glabrous below, the upper surface and margins scabrous to hispid; panicle 15–20 cm. long, the slender lax branches solitary or in twos or threes at the nodes of the axis, bearing 2 to several capillary branchlets each with 1–3 pairs of spikelets toward their tips; rachis joints and pedicels slender, about equal, shorter than the sessile spikelets, white-ciliate on the margins; sessile spikelets about 5 mm. long, narrowly oblong, toward the apex abruptly narrowed into a neck about 1 mm. long; glumes coriaceous, dark brown when mature, the callus and dorsal surface pilose with white hairs; second glume glabrous or only slightly pilose; awn of the fertile lemma 3–4 cm. long, geniculate below the middle, the column dark brown, shining, the margins short-stiff-pubescent with white hairs; pediceled spikelets reduced to one membranous, narrow to subulate glume about 3 mm. long.

BRITISH NEW GUINEA: Northern Division: About 3 miles south of Dobodura, *Reeder 822* (US) (growing on edge of jungle). NORTHEAST NEW GUINEA: Morobe District: Salamaua, *Clemens 34* (A) (trail bank, hill near beach); Malshang, near Lae, *Clemens 10441* (US); Wantoat, *Clemens 10980, 41090* (US).

Australia to New Guinea and the Philippines.

42. *Chrysopogon* Trin.

Chrysopogon Trin., Fund. Agrost. 187. 1820. Nom. conserv.

Rhaphis Lour., Fl. Cochinch. 2: 552. 1790.

Pollinia Spreng., Pl. Pugill. 2: 10. 1815 (non Trin. 1832).

Spikelets mostly in threes at the ends of the panicle branches and branchlets, one sessile and perfect, two pediceled and staminate or neuter, the group falling together, rarely the spikelets in pairs on a 2–4-jointed rachis, but then the spikelets in threes at the ends of the branches; sessile spikelets disarticulating obliquely and forming a more or less elongate sharp-

pointed callus, the callus usually bearded at least on the margins; first glume involute, rounded on the back, keeled upward, the keels usually spiny-hispid; second glume cymbiform, keeled toward the apex and usually aristate; lemmas hyaline, the first 2-nerved, empty; fertile lemma narrow, entire or bidentate, bearing a straight or geniculate awn; pediceled spikelets awnless or with a short straight awn, the glumes of thinner texture than those of the sessile spikelets. Perennials (ours) with terminal strict or rather loose panicles.

TYPE SPECIES: *Chrysopogon Gryllus* (L.) Trin. (*Andropogon Gryllus* L.).

KEY TO THE SPECIES

1. Racemes 2-4-jointed; culms erect, 1-2 meters tall.
 2. Sessile spikelets (including the callus) 5-7 mm. long; callus up to 2 mm. long, white-bearded; racemes longer than the panicle branches.....2. *C. elongatus*.
 2. Sessile spikelets (including the callus) 8-10 mm. long; callus up to 4 mm. long, tawny-bearded; racemes, or many of them, shorter than the panicle branches.....3. *C. filipes*.
1. Racemes reduced to a triad of 1 sessile and 2 pediceled spikelets at the ends of the panicle branches; plants with rhizomes or stolons, the culms ascending to 20-60 cm.....1. *C. aciculatus*.
1. ***Chrysopogon aciculatus*** (Retz.) Trin., Fund. Agrost. 188. 1820; White, Proc. Roy. Soc. Queensl. 34: 15. 1923.
Andropogon aciculatus Retz., Obs. Bot. 5: 22. 1789; K. Schum., Bot. Jahrb. 9: 197. 1887. Type from India.
Rhaphis trivialis Lour., Fl. Cochinch. 2: 553. 1790; Trin., Sp. Gram. Ic. 1: pl. 8. 1830. Type from Cochinchina.
Andropogon acicularis Willd., Sp. Pl. 4: 906. 1806. Based on *A. aciculatus* Retz.
Rhaphis acicularis Desv., Opusc. 69. 1831; Hitchc., Mem. Bishop Mus. 8: 219. fig. 107. 1922; Chase, Jour. Arnold Arb. 20: 315. 1939.²³ Based on *A. aciculatus* Retz.
Rhaphis aciculatus (Retz.) Honda, Bot. Mag. (Tokyo) 40: 103. 1926; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 153. fig. 82. 1940.

Culms ascending from stout creeping rhizomes and stolons, 20-60 cm. tall; leaves densely imbricate on the rhizomes and stolons, distant on the flowering culms; sheaths terete, glabrous or sparingly bearded at the throat, the margins more or less ciliate, the culm sheaths shorter than the internodes; ligule minutely ciliolate; blades flat, rounded at the base, obtuse or subacute at the tips, 2-15 cm. long, 3-5 mm. wide, both sides glabrous or sparsely pilose at the base, the margins sparingly spinulose; panicle long-exserted, linear-oblong, usually purplish, 5-10 cm. long, the filiform branches in whorls of 4-9, about 1 cm. long or less; racemes reduced to a triad of one sessile and two pediceled spikelets; sessile spikelet linear, acuminate from about the middle, about 4 mm. long and with a long sharp rusty-bearded callus 4-6 mm. long, the callus formed by an oblique splitting of the pedicel entirely to the base of the spikelet; first glume spinulose toward the subtruncate or bimucronulate apex; second glume acuminate or aristate, the awn as much as 3 mm. long; fertile lemma entire, with a straight terminal awn 4-7 mm. long; pediceled spikelets 5-6 mm. long, the slender glabrous pedicels 2-3 mm. long.

²³ Hitchcock and Chase give the binomial as "*Rhaphis aciculata* (Retz.) Desv." but Desvaux spelled the specific name "*acicularis*."

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr 11033* (US, NY) (open places); Western Division: Daru Island, *Brass 6426* (A, US) (very troublesome weed on roadsides and town allotments); Northern Division: About 9 miles northwest of Oro Bay, *Reeder 812* (A, US) (frequent in the open in wet places); Goodenough Island: Haiwali village, *Burcham 136* (US) (in vicinity of abandoned native village, mostly about bases of coconuts). NORTHEAST NEW GUINEA: Morobe District: 4 miles south of Langemak Bay, near Finschhafen, *Sawyer 144, 163* (A).

Tropical Asia to Australia, New Guinea, and Polynesia.

2. *Chrysopogon elongatus* (R. Br.) Benth., Fl. Austral. 8: 538. 1878.

Holcus elongatus R. Br., Prodr. Fl. Nov. Holl. 1: 200. 1810. Type from Australia.

Rhaphis elongatus (R. Br.) Chase, Contr. U. S. Nat. Herb. 24: 205. 1925; Hitchc. Brittonia 2: 129. 1936.

Vetiveria elongata (R. Br.) Stapf ex C. E. Hubb., Kew Bull. 1934: 444. 1934.

Culms erect, 1–2.5 meters tall, glabrous, about 7-noded; sheaths mostly longer than the internodes, glabrous or somewhat scabrous; ligule reduced to an even row of short white hairs about 0.2 mm. long; blades long-attenuate, folded for a considerable distance, as much as 50 cm. long, to 8 mm. wide, spinulose-scabrous on the margins and midrib below, otherwise glabrous and smooth, the upper surface with scattered short tubercle-based hairs; panicle pale to purplish, contracted, rather dense, 15–35 cm. long, the branches slender, rather stiff, as much as 4 cm. long; racemes 2–4-jointed, the joints 3–4 mm. long; peduncles 2–3 mm. long; sessile spikelet linear-lanceolate or linear, 5–7 mm. long including the 1.5–2 mm. long callus; the callus bearded on the margin with white or whitish hairs to 3 mm. long; glumes coriaceous, the first acute, spinulose-scabrous on the keels, the second cymbiform, mucronate or aristate with an awn as much as 2 mm. long, keeled upward, the keel spinulose-scabrous; fertile lemma with an awn as much as 12 mm. long, twisted and weakly geniculate below; pediceled spikelets slightly longer than the sessile, the glumes less firm.

BRITISH NEW GUINEA: Western Division: Daru Island, *Brass 6045* (GH, US) (heavy wet soil close behind mangrove fringe), *6283* (A, US) (pure stands on damp soils bordering large swamp); Wassi Kussa River, *Brass 8579* (A, US) (covering small tidal flats at rear of mangrove fringe); *MacGregor 46* (US).

Australia and New Guinea.

Brass 8579 was reported as *Vetiveria filipes* (Benth.) C. E. Hubb. [*Chrysopogon filipes* (Benth.) Reeder] by Chase (17, p. 315), but that species has longer panicle branches and much larger spikelets.

3. *Chrysopogon filipes* (Benth.) comb. nov.

Chrysopogon elongatus (R. Br.) Benth. var. *filipes* Benth., Fl. Austral. 7: 539. 1878. Type from Australia.

Andropogon elongatus (R. Br.) Spreng. var. *filipes* (Benth.) Hack. in DC., Monogr. Phan. 6: 565. 1889.

Vetiveria filipes (Benth.) C. E. Hubb., Kew Bull. 1934: 444. 1934.

3a. *Chrysopogon filipes* (Benth.) Reeder var. *arundinaceus* var. nov.

A typo culmis altioribus et robustioribus, ramulis paniculorum longioribus, articulis rhacheos paucioribus, gluma prima valde flava, arista glumae secundae ad 6 mm. longa differt.

Culms robust, erect, 5–8-noded, 1–1.8 meters tall, glabrous or slightly scabrous beneath the panicle; sheaths more or less scabrous on the keel,

those in the middle of the culm slightly shorter than the internodes, the basal sheaths overlapping; ligule a row of even white hairs about 0.2 mm. long; blades as much as 60 cm. long, 5–8 mm. wide, folded at the base, the margins and midnerve more or less spinulose-scabrous; panicle purplish yellow, 20–30 cm. long, contracted or rather loose, the lower branches 6–8 cm. long, flexuous, sometimes bearing 1 or 2 short branchlets; racemes 2–4-jointed, mostly shorter than the panicle branches, the joints slender, 5–15 (rarely to 20) mm. long, the pedicels usually not exceeding the sessile spikelets; sessile spikelets narrowly lanceolate, pale or stramineous, 8–10 mm. long including the sharp 2–4 mm. long callus; the callus bearded on the back and margins with tawny hairs as much as 1.5 mm. long; glumes coriaceous and muricate over the entire dorsal surface, the keels spinulose; first glume narrowly somewhat truncate, often spinulose on the upper half; second glume mucronate or with an awn as much as 6 mm. long; awn on fertile lemma 10–20 mm. long, flexuous, slightly twisted below, not or only slightly geniculate; pediceled spikelets about 6–8 mm. long, lanceolate or more or less subulate.

BRITISH NEW GUINEA: Western Division: Panzara, between Morehead and Wassi Kussa Rivers, *Brass 8460* (A, TYPE, US), December, 1936 (savannah forests, on alluvial flats of creek).

Differs from the species in being much taller and more robust, having longer panicle branches, fewer-jointed racemes, and the glumes of the sessile spikelets yellow below rather than evenly purple throughout, the second glume with an awn as much as 6 mm. long. In some respects it suggests *Vetiveria intermedia* S. T. Blake, but that species has shorter and thicker rachis joints and pedicels, the pediceled spikelets are, on the whole, less developed, and the glumes are merely scabrous or nearly glabrous on the lower half rather than uniformly muricate as in both *C. filipes* and the new variety.

The cited specimen was reported as *Vetiveria filipes* by Chase (17, p. 315).

43. *Arthraxon* Beauv.

Arthraxon Beauv., *Ess. Agrost.* 111. *pl.* 11, *fig.* 6. 1812.

Spikelets in pairs or solitary, one sessile and perfect, mostly awned, often slightly laterally compressed, at length falling with the appressed rachis joint attached, the other, when present, pediceled, neuter or rarely staminate but usually abortive with only minute pedicels remaining attached to the base of the sessile spikelets; rachis slender, usually tardily disarticulating; first glume rounded on the back, the margins more or less inrolled, usually more or less bristly-hispid on the nerves; second glume keeled, 3-nerved; lower lemma hyaline, short, empty; fertile lemma hyaline or firmer at the base, entire or minutely bidentate, with usually a well developed dorsal awn arising from near the base. Annuals or perennials with flat blades, slender weak culms and digitate or approximate racemes.

TYPE SPECIES: *Arthraxon ciliare* Beauv. = *A. hispidus* (Thunb.) Makino (*Phalaris hispida* Thunb.).

1. *Arthraxon hispidus* (Thunb.) Makino, Bot. Mag. (Tokyo) 26: 214. July, 1912²⁴; Hitchc., Brittonia 2: 128. 1936.

Phalaris hispida Thunb., Fl. Jap. 44. 1784. Type presumably from Japan.

Arthraxon ciliare Beauv., Ess. Agrost. 111, 152. *pl.* 11, *fig.* 6. 1812. No locality given.

Pollinia ciliaris (Beauv.) Spreng., Syst. Pl. 1: 289. 1825.

Culms slender, freely branching, ascending from a decumbent base, the nodes bearded; sheaths shorter than the internodes, pubescent on the collar, the margins ciliate; ligule membranous, ciliate, 1–2 mm. long; blades ovate to ovate-lanceolate, 2–5 cm. long, 5–15 mm. wide, glabrous or pubescent, the base cordate-clasping; racemes 2 to many (rarely solitary), 2–4 cm. long; rachis joints slender, glabrous or ciliate, from half to nearly as long as the spikelet; spikelets lanceolate, 3–5 mm. long, first glume rounded on the back, several-nerved, the nerves bristly-hispid; second glume acuminate, equal to or slightly longer than the first, the keel hispid; awn of the fertile lemma usually 5–15 mm. long, geniculate and twisted; sterile pedicel reduced to a minute bristle rarely half as long as the spikelet, often obsolete.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1900 m., *Brass* 4787 (GH, US) (common on old garden land). NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass* 10735 (A, US) (on a native clearing in the forest).

Tropical and temperate regions of the Old World.

44. *Andropogon* L.

Andropogon L., Sp. Pl. 1045. 1753, Gen. Pl. ed. 5. 468. 1754.

Spikelets in pairs at each node of an articulate rachis, or in threes at the ends of the branches, one sessile and fertile, the other pediceled, staminate or neuter (rarely perfect), sometimes reduced to a single narrow glume; rachis and pedicels of the sterile spikelets slender or sometimes thickened upward, often villous; sessile spikelet dorsally compressed; glumes membranous-coriaceous, awnless, the first rounded, flat or concave dorsally, several-nerved, the median nerve often weak or wanting; second glume cymbiform, keeled; lemmas hyaline, the lower empty; fertile lemma narrow, entire or bifid, usually bearing a slender geniculate and twisted awn, the lemma sometimes reduced to a narrow stipe-like base to the awn; pediceled spikelets awnless (rarely awned), sometimes as large as the sessile and similar to it, but usually more or less reduced. Annuals or perennials of various habitats.

TYPE SPECIES: *Andropogon distachyus* L.

KEY TO THE SPECIES AND VARIETIES

1. Racemes solitary on the culms and branches; rachis joints thickened upward with scarious cupular or toothed appendages.
2. Sessile spikelets 2–4 (rarely to 5) mm. long; rachis joints and pedicels glabrous.
3. Sessile spikelets 3–5 mm. long, awned.
 4. Blades 1–4 cm. long, obtuse.....1. *A. brevifolius*.
 4. Blades 5–9 cm. long, tapering to an acute apex.....
.....1a. *A. brevifolius* var. *cryptopodus*.

²⁴ Same combination published by Merrill in Philip. Jour. Sci. Bot. 7: 229. Sept. 1912.

3. Sessile spikelets 2 mm. long, awnless.....1b. *A. brevifolius* var. *paradoxus*.
 2. Sessile spikelets 7–8 mm. long; rachis joints and pedicels ciliate...2. *A. sanguineus*.
 1. Racemes 2 to several on each peduncle (sometimes solitary in *A. annulatus*).
 5. Racemes 1–8-jointed; panicle branches compound, the racemes borne on branchlets of the third or fourth order.
 6. Racemes reduced to one sessile and two pediceled spikelets (rarely with one or two pairs of spikelets below); first glume of sessile spikelet prominently concave dorsally.
 7. Sessile spikelets awned.....3. *A. micranthus*.
 7. Sessile spikelets awnless.....3a. *A. micranthus* var. *muticispiculus*.
 6. Racemes 3–8-jointed; first glume of sessile spikelet not prominently concave dorsally.....4. *A. spicigerus*.
 5. Racemes 10- or more jointed; panicle branches simple or rarely once branched.
 8. Inflorescence paniculate, the axis 4–14 cm. long.....5. *A. intermedius*.
 8. Inflorescence digitate or the racemes rarely solitary.
 9. First glume long-pilose below the apex and on upper margins, the silky hairs as long as the spikelet or longer, more or less obscuring the spikelets; awn twice-geniculate.....6. *A. sericeus*.
 9. First glume more or less pilose and sometimes with long tubercle-based hairs on the upper margins, but the hairs not silky and obscuring the spikelets; awn once-geniculate.....7. *A. annulatus*.

1. *Andropogon brevifolius* Swartz, Prodr. Veg. Ind. Occ. 26. 1788; Kunth, Rev. Gram. 2: pl. 196. 1829; Hitchc., Brittonia 2: 128. 1936; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 166. fig. 87. 1940. Type from Jamaica.

Schizachyrium brevifolium (Swartz) Nees ex Miquel, Fl. Ind. Bat. 3: 495. 1855.

Andropogon fragilis R. Br. var. *malayanus* Merr., Enum. Philip. Fl. Pl. 1: 45. 1923.

Type from the Philippines.

Annual; culms delicate, much branched, prostrate, trailing or leaning, more or less compressed, mostly 30–70 cm. long; sheaths glabrous, keeled, mostly shorter than the internodes; ligule very short, membranous, often ciliolate; blades flat, obtuse, 1–4 (rarely to 6) cm. long, 2–4 mm. wide, glabrous; racemes solitary, slender, 1–2.5 cm. long, each subtended by a glabrous sheathing spathe; rachis joints clavate, glabrous, shorter and more slender than the sessile spikelets, bidentate at summit; sessile spikelets 3–4 mm. long, the callus very short, white-bearded; first glume dorsally scaberulous, scabrous on the keels, bifid; awn of fertile lemma delicate, geniculate and twisted, as much as 1 cm. long; pediceled spikelets reduced to an awned glume 1–1.5 mm. long, the slender straight awn as much as 5 mm. long; pedicel glabrous, slightly shorter than the sessile spikelet.

BRITISH NEW GUINEA: Western Division: Dagwa, Oriomo River, alt. 40 m., Brass 5985 (GH, US) (common on damp flats and ridge slopes); Lake Daviumbu, Middle Fly River, Brass 7812 (A, US) (common on sour savannah slopes). NORTHEAST NEW GUINEA: Morobe District: Kajabit, Markham Valley, Clemens 10477 (US). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., Brass 11723 (A, US) (deforested slopes; locally abundant on sandy soil).

Tropical and temperate regions of both hemispheres.

1a. *Andropogon brevifolius* Swartz var. *cryptopodus* (Ohwi) comb. nov.

Andropogon cryptopodus Ohwi, Bot. Mag. (Tokyo) 56: 10. 1942. Type from Netherlands New Guinea.

Differs from the species in the more robust habit, longer (5–9 cm.) blades tapering to an acute apex, and slightly larger spikelets.

NETHERLANDS NEW GUINEA: Momi, 60 miles south of Manokwari, alt. 10 m., *Kanehira & Hatusima 13390* (A, TYPE COLL.) (in open grass field along the track to Lake Angi).

Ohwi allies his species to *Andropogon sanguineus*, but it is much more closely related to *A. brevifolius*. The spikelets are almost identical with those of the latter species, although they tend to be slightly larger. The only important differences seem to be the somewhat more robust habit and longer blades, which are acute rather than obtuse.

Ohwi's description and type duplicate agree rather well with the description of *Andropogon brevifolius* var. *fragilis* (R. Br.) Hack. (in DC., *Mongr. Phan.* 6: 364. 1889). This variety is based on *A. fragilis* R. Br., but Hackel's description does not well agree with the original diagnosis by Brown (11, p. 202), in which the rachis is said to be "sericeo-barbatis." Hackel's description states "racemis gracilibus, articulis glabris." The Kanehira and Hatusima specimen cited above has glabrous rachis joints.

1b. *Andropogon brevifolius* Swartz var. *paradoxus* (Buse) Ohwi, *Acta Phytotax. Geobot.* 11: 169. 1942.

Schizachyrium paradoxum Buse in Miquel, *Pl. Jungh.* 359. 1854. Type from Sumatra.

Schizachyrium brevifolium (Swartz) Nees ex Miquel subsp. *paradoxum* (Buse) Henr., *Blumea* 1: 308. 1935.

Differs from the species in having awnless sessile spikelets only 2 mm. long; pediceled spikelets 0.5 mm. long, awnless or with an awn about as long as the spikelet.

BRITISH NEW GUINEA: Northern Division: 1 mile north of East Embi Lake, *Reeder 849* (A, US) (forming mats in low wet ground).

Indo-China, Sumatra, Borneo, the Philippines, and New Guinea.

2. *Andropogon sanguineus* (Retz.) Merr., *Philip. Jour. Sci. Bot.* 12: 101. 1917; Chase, *Jour. Arnold Arb.* 20: 315. 1939.

Rottboellia sanguinea Retz., *Obs. Bot.* 3: 25 [error for 13]. 1783. Type from China.

Andropogon pseudograya Steud., *Syn. Pl. Glum.* 1: 365. 1854; Hack. in DC., *Monogr. Phan.* 6: 370. 1889. Type from Ceylon.

Schizachyrium sanguineum (Retz.) Alston, *Suppl. Fl. Ceylon* 6: 334. 1931.

Culms usually tufted, erect, rather slender, 50–100 cm. tall, freely branching above, the branches appressed to the flat side of the culm; sheaths keeled, glabrous and smooth; ligule membranous, about 1.5 mm. long; blades flat, 5–20 cm. long, 1–5 mm. wide, glabrous, the margins and midrib below scabrous; racemes solitary, slender, 5–7 cm. long, shortly exserted or the lower part included in the narrow spathe; rachis joints rather slender, dilated upward, slightly shorter than the sessile spikelets, glabrous or sometimes ciliate along the outer or both margins, the base bearded with white hairs 1–2 mm. long; sessile spikelets 7–8 mm. long, narrowly linear, the first glume glabrous, tuberculate-scabrous; awn of fertile lemma up to 15 mm. long, geniculate and twisted below; pediceled spikelets reduced, about 3 mm. long, awned, the awn slender, straight, about as long as the spikelet; pedicels about as long as the rachis joints or slightly shorter, ciliate on the margins, the hairs increasing in length upward.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, Middle Fly River, *Brass 7933* (A, US) (occasional on sour savannah slopes).

India to South China, Malaysia, and New Guinea.

3. *Andropogon micranthus* Kunth, Rev. Gram. 1: 165. 1829; Hitchc., Brittonia 2: 128. 1936. Based on *Holcus parviflorus* R. Br.

Holcus parviflorus R. Br., Prodr. Fl. Nov. Holl. 1: 199. 1810. Type from Australia.
Andropogon parviflorus (R. Br.) Domin, Bibl. Bot. 85: 263. 1915 (non Roxb. 1820).
Capillipedium parviflorum (R. Br.) Stapf in Prain, Fl. Trop. Afr. 9: 169. 1917.

Perennial; culms tufted, slender, up to 1 meter or more tall, erect or ascending, simple or sparingly branched, glabrous or appressed-pubescent, especially near the nodes; nodes short-bearded; sheaths mostly shorter than the internodes, glabrous or more or less papillose-pubescent, the margins ciliate, the collar often villous; ligule very short, truncate, ciliolate; blades flat or the margins revolute, as much as 30 cm. long, 2–6 mm. wide, rather firm, the margins and upper surface scabrous, smooth to scaberulous beneath, glabrous or puberulent, often with a few long tubercle-based hairs on the upper surface near the ligule; panicle 8–25 cm. long, the branches and branchlets very slender, pubescent in their axils, otherwise usually glabrous, sometimes puberulent throughout; racemes borne on branches of the third and fourth order, 1-jointed, reduced to 1 sessile and 2 pediceled spikelets (rarely 2 or more jointed and with one or more pairs of spikelets below); sessile spikelets narrowly oblong to elliptic, 2.5–3 mm. long, the callus short-bearded; first glume hispidulous, shallowly concave on the back; fertile lemma narrow, awned, the awn geniculate, twisted, 11–16 mm. long; pediceled spikelets awnless, usually staminate (rarely neuter), similar to the sessile spikelet or more or less reduced.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass* 3558 (A, US) (common on savannah hillsides); Urunu, Vanapa Valley, alt. 1900 m., *Brass* 4799 (GH, US) (common on open grasslands); ? Division: "Barowara," *MacGregor* 10 (US); Quaipo, *MacGregor* 20 (US). NORTHEAST NEW GUINEA: Morobe District: Wau, *Clemens* 10458 (US) (steep grasslands above gold fields); Kajabit, Markham Valley, *Clemens* 10451bis (US) (grassland). NEW BRITAIN: Cape Gloucester, *Burcham* 141 (US) (in open grassland).

Tropical and subtropical regions of the Old World.

MacGregor 20 has some of the racemes 3- or 4-jointed and is, in this respect, like *Andropogon spicigerus*. The first glume of the sessile spikelet, however, is rather prominently concave dorsally and has only 2 or 3 intercarinal nerves, characters which would place this specimen in *A. micranthus*.

- 3a. *Andropogon micranthus* Kunth. var. *muticispiculus* (Ohwi) comb. nov.

Bothriochloa parviflora (R. Br.) Ohwi var. *muticispicula* Ohwi, Tokyo Sci. Mus. Bull. 18: 13. 1947.

BRITISH NEW GUINEA: Central Division: Kanosia, *Carr* 11106, 11309 (NY) (open savannah land); Northern Division: South of Dobodura, *Reeder* 801 (A, US) (common in open grassland); about 9 miles northwest of Oro Bay, *Reeder* 810 (A, US) (in dense grassland; panicles open); Without precise locality: *MacGregor* 52 (US). NORTHEAST NEW GUINEA: Morobe District: Kajabit, Markham Valley, *Clemens* 10541 (US) (grassland); Ramu Valley, near the headwaters of the Markham River, *Rogers* 3003 (A).

This variety appears to differ from the species in no other particular except the absence of an awn on the perfect spikelet. Examination of the extensive collections of this species in the U. S. National Herbarium

reveals no awnless specimens except those from New Guinea. The two forms apparently grow side by side, as one of the collections (*Clemens 10541*) consisted of a mixture of awned and awnless plants.

4. *Andropogon spicigerus* (S. T. Blake) comb. nov.

Capillipedium spicigerum S. T. Blake²⁵, Queensl. Univ. Dept. Biol. Papers 2: 43. 1944. Type from Australia.

Culms 90–120 cm. tall, slender to subrobust, erect or somewhat geniculate at base, simple or sparsely branching, glabrous or sometimes appressed-pilose, often pruinose below the nodes; sheaths terete or somewhat keeled above, glabrous to more or less papillose-hirsute; ligule truncate, ciliolate, about 0.75 mm. long; blades linear, flat or the margins revolute, as much as 40 cm. long, 5–10 mm. wide, narrowed toward the base, the apex long-attenuate, scaberulous above, glabrous beneath, the margins scabrous, the upper surface often pilose toward the base, otherwise glabrous; panicle ovate to lanceolate, purplish or rarely pale, 10–20 cm. long, the branches and branchlets slender, pubescent in their axils, otherwise glabrous or sometimes sparsely puberulent; racemes 3–8 (ours mostly 4–5)-jointed, borne on branches of the third or fourth order; joints and pedicels subequal, half to two-thirds as long as the sessile spikelets, ciliate on one or both sides; sessile spikelet oblong-lanceolate, acutish, the callus short-bearded; first glume 6–9-nerved (2–5 intercarinal nerves), dorsally more or less stiff-puberulent and slightly depressed, the keels shortly pectinate on the upper half; second glume scabrous on the keel or nearly smooth; sterile lemma hyaline, half to two-thirds as long as the glumes; fertile lemma narrow, awned, the slender awn 12–18 mm. long, geniculate and twisted below the bend; pediceled spikelets awnless, staminate or neuter, shorter and narrower than the fertile or sometimes nearly as long (in our specimens mostly neuter and reduced to small lanceolate glumes half to two-thirds as long as the sessile spikelets).

NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass 11616, 11805, 11845* (A, US) (common on deforested slopes).

Australia and New Guinea.

Closely related to *Andropogon micranthus* but differing in the 3–8-jointed racemes, sessile spikelet with the first glume less concave on the back and often with 4 or 5 intercarinal nerves, and the more robust habit. Blake (7, p. 45) states that there are always 4 or 5 intercarinal nerves, but our specimens, which agree well with the original description and with a type duplicate (at US) in other respects, often have only 2 or 3 intercarinal nerves; however, some of the sessile spikelets on these plants have 4 or 5 intercarinal nerves on the first glumes in the same inflorescence. The actual spikelet differences between this species and *A. micranthus* appear very slight, but the plants have a rather distinct appearance and the 3–8-jointed raceme seems quite constant. Perhaps the species would be better treated as a variety, but for the present it seems preferable to retain it as a species pending further study of collections from other parts of its range.

²⁵ Although Blake uses the same epithet, this is not a new combination based on *Chrysopogon parviflorus* (R. Br.) Benth. var. *spicigera* Benth. (Fl. Austral. 7: 538. 1878), but a new species based on a new type. For a detailed discussion see Blake (7, p. 43–46. 1944).

The cited specimens were all reported as *Andropogon intermedius* R. Br. by Chase (18, p. 89).

5. *Andropogon intermedius* R. Br., Prodr. Fl. Nov. Holl. 1: 202. 1810. Type from Australia.

Bothriochloa intermedia (R. Br.) A. Camus, Ann. Soc. Linn. Lyon II. 76: 164. 1931.

Perennial; culms tufted, 50–100 cm. or more tall, erect or geniculate at base, simple or sparingly branched, glabrous, the nodes sometimes short-bearded; sheaths glabrous, terete or slightly keeled upward, mostly shorter than the internodes; ligule very short, truncate; blades flat or revolute, 10–30 cm. long, 3–6 mm. wide, smooth or scaberulous, the margins scabrous; panicle 6–15 cm. long, open, loose to somewhat dense, the axis 3–14 cm. long; branches slender, solitary or in pairs, the lower sometimes in fours, usually simple but sometimes branched, often bearded in the axils, otherwise glabrous; racemes slender, 2–5 cm. long, 10- or more jointed; joints and pedicels ciliate, the hairs up to 2.5 mm. long; sessile spikelet elliptic-oblong, obtuse, 3–4 mm. long, the callus short-bearded; first glume with 5–7 intercarinal nerves, pectinate on the upper part of the keels, dorsally depressed or sometimes with a circular pit, more or less pubescent on the lower half; awn of the narrow fertile lemma slender, 10 mm. or more long, geniculate and twisted below the bend; pediceled spikelets awnless, staminate or neuter, about as long as the sessile and similar to it but narrower.

BRITISH NEW GUINEA: Central Division: Kanosia, Carr 11329 (NY) (open savannah land).

China to Malaysia, Australia, and New Guinea.

6. *Andropogon sericeus* R. Br., Prodr. Fl. Nov. Holl. 1: 201. 1810; Bailey, Queensl. Agric. Jour. 7(4): 350. 1900; White, Proc. Roy. Soc. Queensl. 34: 15. 1923. Type from Australia.

Dicanthium sericeum (R. Br.) A. Camus, Bull. Mus. Hist. Nat. (Paris) 27: 549. 1921.

Perennial; culms densely tufted, erect, subrobust, 40–100 cm. tall, simple or with few to several floriferous branches from the upper nodes, often pruinose; nodes stellate-bearded; sheaths glabrous, keeled above, mostly shorter than the internodes, often pruinose like the culms; ligule membranous, ciliolate, 1–1.5 mm. long; blades flat or revolute, rigid, 10–25 cm. long, 2–5 mm. wide, glabrous below, the upper surface and margins scabrous; racemes 2–7, digitate, 2.5–5 cm. long, silky-villous; rachis joints and pedicels slender, the pedicels about half as long as the sessile spikelets, the joints slightly shorter, both ciliate, the hairs increasing in length upward; sessile spikelet oblong to ovate-oblong, about 4 mm. long; first glume obtuse, 7-nerved, pubescent on the lower half, papillose-pilose below the apex and along the margin on the upper half, the hairs equaling the spikelet or longer; awn 20–25 mm. long, twice geniculate; pediceled spikelets similar to the sessile, but awnless.

Australia.

No specimens of this species from New Guinea were seen, but it is included here since it has been reported several times. The description was based on Australian specimens.

7. *Andropogon annulatus* Forsk., Fl. Aegypt. Arab. 173. 1775; White, Proc. Roy. Soc. Queensl. 34: 15. 1923. Type from the banks of the Nile.

Dichanthium annulatum (Forsk.) Stapf in Prain, Fl. Trop. Afr. 9: 178. 1917.

Perennial; culms slender, densely tufted, erect or geniculately ascending, 50–100 cm. tall, glabrous except for the short-bearded nodes; sheaths glabrous, distinctly shorter than the internodes, slightly keeled above; ligule membranous, ciliolate, 0.5–1.5 mm. long; blades narrowly linear, 5–15 cm. long, 1.5–3 mm. wide, flat or revolute, the margins and lower surface scaberulous, the upper surface often sparsely pilose with tubercle-based hairs; racemes 1–5, digitate, 2–5 cm. long, spikelet-bearing to the base; rachis joints and pedicels subequal or the joints shorter, slender, about half as long as the sessile spikelets or shorter, ciliate, the hairs increasing in length upward; sessile spikelet oblong-elliptic, obtuse, about 4 mm. long; first glume prominently nerved, more or less pilose, sometimes with long tubercle-based hairs especially near the margins above; awns slender, 15–20 mm. long, geniculate and twisted below the bend; pediceled spikelets similar to the sessile but awnless.

BRITISH NEW GUINEA: Central Division: Port Moresby, *Brass* 8787 (A, US) (common on roadsides); Western Division: Daru Island, *Brass* 6404 (A, US) (growing about the wharf, apparently of recent introduction).

Africa to India, China, Australia, and New Guinea.

The cited specimens were reported as *Andropogon annulatus* var. *monostachys* F. Muell. ex Benth., by Chase (17, p. 315), but examination of a type fragment (at A) reveals that this variety has much larger spikelets and the racemes are stouter. This form has been described as a species under the genus *Dichanthium* (*D. fecundum*) by S. T. Blake (7, p. 51. 1944). In his discussion under this species, Blake states (op. cit. p. 54) that the pediceled spikelets usually are perfect and contain a well developed pistil. The pistil produces a grain and seems to be equally fertile to that of the sessile spikelet. These pediceled spikelets commonly have also a well developed geniculate and twisted awn, he states. Blake's new species is apparently confined to Australia.

45. *Cymbopogon* Spreng.

Cymbopogon Spreng., Pl. Pugill. 2: 14. 1815.

Racemes in pairs, one sessile, the other short-peduncled, included in an inflated spathe, the spathes in a large compound inflorescence; spikelets paired as in *Andropogon*, but the lower pair, in one or both racemes, homogamous (both awnless, staminate or neuter), otherwise the sessile spikelet perfect, usually awned, the pediceled spikelet staminate, awnless; rachis fragile, the joints falling attached to the sessile spikelet, the callus short, blunt; sessile spikelet more or less dorsally compressed; glumes membranous-chartaceous, the first flat or rounded on the back, rather prominently two-keeled, the margins inflexed; second glume wing-keeled toward the apex; lemmas hyaline or the lower thinly membranous, the fertile bearing a twisted geniculate awn with a glabrous column (rarely awnless). Robust often aromatic perennials with simple culms below the spathaceous inflorescences. This genus includes the oil grasses of commerce.

TYPE SPECIES: *Cymbopogon Schoenanthus* (L.) Spreng. (*Andropogon Schoenanthus* L.).

1. *Cymbopogon procerus* (R. Br.) Domin, *Bibl. Bot.* 85: 273. 1915; Hitchc., *Brittonia* 2: 128. 1936.

Andropogon procerus R. Br., *Prodr. Fl. Nov. Holl.* 1: 202. 1810. Type from Australia.

Culms erect, 1–2.5 meters tall, glabrous or sometimes more or less pubescent below the nodes; sheaths glabrous, shorter than the internodes; ligule membranous, 3–4 mm. long, more or less erose or ciliate at summit; blades as much as 90 cm. long, 5–20 mm. wide, attenuate at the base, usually somewhat involute, glabrous on both surfaces, the margins scabrous; panicle 15–30 cm. long, narrow, dense, with numerous short branches, the acuminate cymbiform spathes about equal to or longer than the 1.5–2 cm. long racemes; rachis joints and pedicels equal, rather slender, about half as long as the sessile spikelet, clothed with spreading silky hairs, those on the upper part up to 3 mm. long; lowermost pair of spikelets on the sessile raceme homogamous, awnless, reduced to a many-nerved first glume 3–4 mm. long or sometimes with a short second glume enclosed, the pediceled spikelets throughout the inflorescence of the same nature; sessile spikelet about 4 mm. long including the short-bearded callus; first glume lanceolate, 5–6-nerved, the nerves prominent above, becoming obscure toward the base, the keels narrowly winged toward the obtuse or bifid apex; second glume cymbiform, equal to the first, about 5-nerved, narrowly wing-keeled toward the summit, the margins ciliate; lemmas subequal, about one-fourth shorter than the glumes, the lower empty, thinly membranous, the margins ciliate; fertile lemma hyaline, cleft to the middle and bearing a twisted and geniculate awn from the base of the cleft, the awn about 12 mm. long, the brownish column about 5 mm. long.

BRITISH NEW GUINEA: Central Division: Baroka, Nakeo District, alt. 50 m., *Brass* 3713 (GH, US) (small scattered tufts); Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass* 5725 (GH, US) (on savannah at about its junction with the rain-forest); Daru Island, *Brass* 6364 (A, US) (uncommon on drier soils of savannah forests); Gaima, Lower Fly River, *Brass* 8370 (A, US) (clumps in denser savannah forest).

Australia and New Guinea.

The cited specimens agree with the short original description, and, in general, with the more detailed description by Hackel (23, p. 94). While Hackel states that there are no nerves between the keels on the first glume, the New Guinea specimens have 3 or 4 nerves which are rather prominent above and obscure below, and the keels are very narrowly winged. The specimen cited as *Andropogon Nardus* L. var. *grandis* Hack. by C. T. White (75, p. 15) may be this species.

Cymbopogon flexuosus (Nees ex Steud.) Stapf, *Kew Bull.* 1906: 319. 1906.

Andropogon flexuosus Nees ex Steud., *Syn. Pl. Glum.* 1: 388. 1854. Type from India.

Andropogon Nardus L. var. *flexuosus* (Nees ex Steud.) Hack. in DC., *Monogr. Phan.* 6: 603. 1889; K. Schum., *Notizbl. Bot. Gart. Berlin* 2: 91. 1898; K. Schum. & Lauterb., *Fl. Deutsch. Schutzgeb. Südsee* 173. 1901.

This is one of the Citronella or Lemon Grasses. It has been cultivated by the colonists and by the natives of New Britain, according to the above

reports. This species is characterized by its large, loose, greyish or slate colored panicles with very slender long flexuous and often drooping branches and usually very slender acute spikelets. No specimens from this region have been seen.

46. *Hyparrhenia* Anderss.

Hyparrhenia Anderss., Nova Acta Soc. Sci. Upsal. III. 2: 231, 244, 254. 1856, nomen; in Schweinf., Beitr. Fl. Aethiop. 300. 1867, nomen; Fourn., Mex. Pl. 2: 51, 67. 1886, sine descr.; Stapf in Prain, Fl. Trop. Afr. 9: 291. 1918, descr.

Racemes in pairs, one sessile, the other short-peduncled, subtended by a narrow sheathing spathe, the spathes in a large compound inflorescence; spikelets paired, the lowest pair in one or both racemes homogamous, staminate or neuter as in *Cymbopogon*, but the sessile perfect spikelet disarticulating obliquely, leaving a sharp-pointed callus and the awn of the fertile lemma hirtellous below the bend; glumes membranous-chartaceous, the first sometimes dorsally grooved, with inflexed margins, but the edges rounded, not sharply keeled; second glume cymbiform, rounded below, somewhat keeled toward the summit; pediceled spikelets often with the first glume short-awned. Perennials, not aromatic, with compound spatheate panicles.

TYPE SPECIES: *Hyparrhenia pseudocymbaria* (Steud.) Stapf.

1. *Hyparrhenia bracteata* (Humb. & Bonpl. ex Willd.) Stapf in Prain, Fl. Trop. Afr. 9: 360. 1918; Hitchc., Brittonia 2: 128. 1936; Pilger, Nat. Pflanzenfam. ed. 2. 143: fig. 94. 1940.

Andropogon bracteatus Humb. & Bonpl. ex Willd., Sp. Pl. 4: 914. 1806. Type from Cumana [Venezuela].

Cymbopogon bracteatus (Humb. & Bonpl. ex Willd.) Hitchc., Contr. U. S. Nat. Herb. 17: 209. 1913.

Culms erect, tufted, 60–200 cm. tall; sheaths hirsute or the upper glabrous, the basal densely villous; ligule membranous, about 2–3 mm. long, ciliate or often erose; blades linear, as much as 60 cm. long, 3–6 mm. wide, flat or more or less convolute, glabrous above, the lower surface more or less pubescent; panicle narrow, 20–40 cm. long; spathes 2–4 cm. long, reddish brown, glabrous or nearly so; racemes about 1 cm. long, the common peduncle slender, exerted from the side of the spathe, clothed with yellow spreading papillose-based hairs, the racemes finally divergent or reflexed, one of them sessile with a pair of homogamous sterile awnless spikelets at base and above them one perfect sessile long-awned spikelet and two sterile awnless pediceled spikelets, the other raceme similar but short-peduncled and without the pair of homogamous spikelets at base; perfect spikelet 6–7 mm. long including the sharp-pointed callus, dorsally glabrous, the callus and slender pedicels clothed with short white hairs, the awn of the fertile lemma 2.5–4 mm. long, geniculate in the middle, the column hirtellous; sterile spikelets similar but the first glume with a short straight awn 1–2 mm. long.

BRITISH NEW GUINEA: Central Division: Urunu, Vanapa Valley, alt. 1500 m., Brass 4817 (A, US) (one of the commonest of open grassland species).

Tropical America, tropical Africa, Indo-China, China, and New Guinea.

The cited specimens are overmature and most of the spikelets have fallen. They are, however, complete enough for fairly accurate compari-

son and seem to be identical with plants of this species from China. They are slightly smaller than the South American plants and have glabrous rather than appressed-hirsute spathes.

47. *Themeda* Forsk.

Themeda Forsk., Fl. Aegypt. Arab. 178. 1775.

Spikelets in pairs, or in threes in the terminal rachis joints, the lowermost two pairs of the raceme homogamous, staminate or neuter, awnless, closely approximate and appearing verticillate or like an involucre, the remaining 1–3 pairs heterogamous, one sessile and perfect, the other pediceled, staminate or neuter; fertile spikelets terete, usually awned (rarely awnless), obliquely disarticulating with a sharp rufous-bearded callus; racemes solitary in each proper spathe, these aggregated in flabellate clusters or solitary in the axils. Perennials or annuals with compound or simple spatheate panicles.

TYPE SPECIES: *Themeda triandra* Forsk.

KEY TO THE SPECIES AND VARIETIES

1. Involucral spikelets sterile, reduced to a single thin, membranous glume; plants annual.....1. *T. frondosa*.
1. Involucral spikelets with two well developed glumes, often staminate; plants perennial.
 2. Involucral spikelets borne at the same level; culms slender; midrib of blades thin, fine.....2. *T. triandra*.
 2. Involucral spikelets borne at different levels; culms robust; midrib of blades broad, conspicuous.
 3. Involucral spikelets clothed with golden or brown tubercle-based hairs; fertile spikelets awnless or with a short straight awn 10 mm. long or less.
 4. Involucral spikelets 6.5–8 mm. long; fertile spikelets 6.5–7 mm. long including the callus; first glume sparsely puberulent, prominently 5–7-nerved....3. *T. gigantea*.
 4. Involucral spikelets 10–13 mm. long; fertile spikelets 9–10 mm. long including the callus; the first glume densely puberulent with golden or brownish hairs.....3a. *T. gigantea* var. *amboinensis*.
 3. Involucral spikelets glabrous or scaberulous; fertile spikelets awned, the awn 2.5–3 cm. long, geniculate and twisted....3b. *T. gigantea* var. *novoguineensis*.

1. *Themeda frondosa* (R. Br.) Merr., Bur. Sci. Publ. Manila 9: 89. 1917; Chase, Jour. Arnold Arb. 20: 316. 1939.

Anthisteria frondosa R. Br., Prodr. Fl. Nov. Holl. 1: 200. 1810. Type from Australia.

Themeda arguens sensu Hack. in DC., Monogr. Phan. 6: 657. 1889 (non *Stipa arguens* L.).

Annual; culms erect to geniculately ascending, more or less compressed, often rooting from the lower nodes, 60–120 cm. tall (to 3 meters fide Hackel); sheaths keeled, much shorter than the internodes, glabrous to more or less papillose-hirsute; ligule membranous, 1–2 mm. long, rounded-truncate; blades flat, 10–40 cm. long, 4–6 mm. wide, glabrous to more or less pilose above toward the base, smooth below, the upper surface and margins scaberulous to scabrous; panicle one-third to half the length of the plant, strongly interrupted, composed of 2 or 3 remote nodes, the branches solitary to binate and bearing numerous fascicled branchlets,

these capitate, each head bearing 6–20 fertile racemes and often several sterile ones; proper spathes 3.5–4 cm. long, long-attenuate, glabrous to more or less papillose-pilose toward the base; racemes about 1.5 cm. long, bearing 1 fertile spikelet; involucrel spikelets 8–10 mm. long, reduced to one thin membranous glume, this acute, bi- or tricuspidate, 5–7-nerved, one or both margins broadly scarious-winged; perfect spikelets 8–10 mm. long, including the 3–4 mm. long callus; the callus sharp-pointed, curved, glabrous dorsally, the sides and ventral part densely bearded, the hairs at first golden, becoming brown when mature, extending to about the middle of the spikelet; glumes hispid to tuberculate-scabrous above, smooth below; awn stout, 7–9 cm. long, geniculate and twisted, puberulent below the bend.

BRITISH NEW GUINEA: Western Division: Mabaduan, *Brass* 6474 (A, US) (locally abundant on sandy soil in savannah forests).

Philippines to Malaysia, Australia, and New Guinea.

2. *Themeda triandra* Forsk., *Fl. Aegypt. Arab.* 178. 1775; K. Schum. & Lauterb., *Fl. Deutsch. Schutzgeb. Südsee* 173. 1901; C. E. Hubb., *East. Afr. Pasture Pl.* 28. *fig. 15.* 1926; Blatter & McCann, *Imp. Council Agric. Res. Sci. Monogr.* 5: 115. *pl. 74.* 1935; Pilger, *Nat. Pflanzenfam.* ed. 2. 14e: 179. *fig. 95.* 1940. Type from Arabia.

Anthistiria imberbis Retz., *Obs. Bot.* 3: 11. 1783; C. T. White, *Proc. Roy. Soc. Queensl.* 34: 15. 1923. No locality is given.

Anthistiria australis R. Br., *Prodr. Fl. Nov. Holl.* 1: 200. 1810; K. Schum., *Bot. Jahrb.* 9: 197. 1889. Type from Australia.

Anthistiria Forskalii Kunth, *Rev. Gram.* 1: 162. 1829.²⁶

Anthistiria vulgaris Hack., *Nat. Pflanzenfam.* II. 2: 29. *fig. 20.* 1887²⁷; K. Schum. & Hollr., *Fl. Kais. Wilhelmsland* 22. 1889.

Themeda Forskalii (Kunth) Hack. in DC., *Monogr. Phan.* 6: 659. 1889, *Bot. Jahrb.* 13: 261. 1890.

Themeda australis (R. Br.) Stapf in Prain, *Fl. Trop. Afr.* 9: 420. 1919.

Perennial; culms rather slender, erect or geniculately ascending, terete or subcompressed, glabrous, often pruinose below the nodes; sheaths overlapping below, shorter than the internodes in the upper part of the culm, keeled, glabrous or more or less papillose-hispid or pilose; ligule membranous, ciliolate, 1–1.75 mm. long, rounded-truncate; blades with a thin fine midrib, linear, 10–40 cm. long, 2–7 mm. wide, usually glabrous beneath, the margins and upper surface often papillose-pilose; panicle narrow, one-fourth to one-third the length of the plant; racemes 12–18 mm. long on peduncles 1–5 mm. long; the involucrel spikelets borne at the same level, glabrous or with scattered stiff tubercle-based hairs; fertile spikelets 6–9 mm. long including the brown hairy callus, dorsally glabrous, hispidulous toward the apex; awns 3–6 mm. long, twisted and geniculate, the column puberulent.

²⁶ Kunth gives as the basis of this name *Themeda polygama* Forsk., but there is no *T. polygama* in Forskal's work. There is a *T. polygama* Gmel. (*Syst. Nat.* 2: 149. 1791) in which the reference is: "Forsk. *Fl. aeg. arab.* p. 178." The only species of *Themeda* in that work is *T. triandra* Forsk.

²⁷ Hackel gives no description, but there is an excellent plate. He states: "*A. ciliata* der Autoren, nicht L. fil." The distribution is given as from Syria to Algeria to Cape-land and Tasmania, the "Kangaroo Grass" of the Australian farmer. In DC., *Monogr. Phan.* 6: 659. 1889, Hackel reduces this species to *Themeda Forskalii* (Kunth) Hack. = *T. triandra* Forsk.

BRITISH NEW GUINEA: Central Division: Budotobara, alt. about 100 m., *Brass* 765 (GH, US) (a dominant species on dry savannahs); Rona, Laloki River, alt. 450 m., *Brass* 3692 (A, US) (common savannah grass); Baroka, Nakeo District, alt. 50–100 m., *Brass* 3723 (the dominant grass on higher ridges in this locality); Kanosia, *Carr* 11133 (NY) (open savannah land); Northern Division: About 9 miles northwest of Oro Bay, *Reeder* 803 (A, US) (bunchgrass, common in grasslands); Western Division: Wuroi, Oriomo River, alt. 10–30 m., *Brass* 5873 (rare, scattered on banks of a savannah stream); Dagwa, Oriomo River, alt. 40 m., *Brass* 5927 (A, US) (the dominant species on large areas of open ridges); Daru Island, *Brass* 6269 (A, US) (dominant grass over most of savannah forest). NORTHEAST NEW GUINEA: Morobe District: Ramu Valley, near the headwaters of the Markham River, *Rogers* 3004 (A). NETHERLANDS NEW GUINEA: West of Hollandia, *Sigafoos* 28 (A). SOLOMON ISLANDS: Guadalcanal: Berande, *Brass* 2551 (GH) (the principal species on the extensive grassy slopes peculiar to the west side of the Island); Florida: *Brass* 3241 (GH) (stony hillsides, common, grows in tussocks).

Widely distributed in tropical and temperate regions of the Old World.

3. *Themeda gigantea* (Cav.) Hack. in DC., Monogr. Phan. 6: 670. 1889; K. Schum., Notizbl. Bot. Gart. Berlin 2: 92. 1898.

Anthistiria gigantea Cav., Ic. Pl. 5: 36. pl. 458. 1799; F. Muell., Pap. Pl. 2: 51. 1886. Type from the Philippines.

Perennial; culms caespitose, erect, 1.5–4 meters tall, robust, glabrous, terete or subcompressed, unbranched below the inflorescence, often pruinose below the nodes; sheaths shorter than the internodes, compressed, keeled, glabrous or somewhat pubescent on the upper margins; ligule short, truncate to rounded, membranous, ciliolate; blades lanceolate-linear to narrowly linear, 30–100 cm. long, 5–25 mm. wide, flat or canaliculate, rigid, erect, scabrous above, often glaucous below, the margins serrulate-scabrous, the midrib broad, prominent; panicle ample, as much as 1 meter or more long; spathes 1–1.2 cm. long; racemes divergent, about 1 cm. long, borne on peduncles 1–2 mm. long; involucre spikelets 6.5–8 mm. long, borne at different levels, the first glume clothed with golden or brownish tubercle-based hairs; perfect spikelets awnless, usually solitary in each raceme, 6.5–7 mm. long including the 1.5 mm. long callus, sparsely puberulent, the first glume distinctly 5–7-nerved.

SOLOMON ISLANDS: Florida: N'Gela, *Brass* 3518 (GH) (growing here and there along the foreshores; very tall, coarse tussock grass).

A wide ranging polymorphic species. The above description applies to Hackel's subsp. *genuina* var. *genuina*.

3a. *Themeda gigantea* (Cav.) Hack. var. *amboinensis* Hack. in DC., Monogr. Phan. 6: 673. 1889.

Racemes 1.5–2 cm. long; peduncles 5–7 mm. long, pilose with yellowish or brownish hairs at least on the upper half; spathes glabrous, 2–3.5 cm. long; involucre spikelets 10–13 mm. long, the first glume clothed with yellowish to brownish tubercle-based hairs; perfect spikelets densely puberulent with golden or brownish hairs, 9–10 mm. long including the 2 mm. long callus, 1 or 2 in each raceme, awnless or with a short straight awn as much as 10 mm. long.

BRITISH NEW GUINEA: Central Division: Bisiatabu, alt. about 470 m., *Brass* 634 (A, US) (tall coarse grass 6–8 ft. high on dry savannahs); Gulf Division: Kerema, *Brass* 1205 (GH, US) (open grassland near the coast); Western Division: Daru Island, *Brass* 6382 (A, US) (about edges of rain forest second

growths, not common; in clumps about 3 meters high); Lake Daviumbu, Middle Fly River, *Brass* 7768 (A) (a solitary specimen in an overgrown garden clearing). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., *Brass* 11678 (A, US) (plentiful along old dykes and other well drained situations on river plain; clumps up to 3 meters high). NEW BRITAIN: *R. Parkinson* 64 (US). SOLOMON ISLANDS: S a n C r i s t o v a l: Waimamura, *Brass* 2857, 3126 (GH) (small area of natural grassland; rare; tall robust species).

Netherlands Indies to New Guinea.

Distinguished from the species by the longer spathes, longer peduncles, larger involucral spikelets, and the larger perfect spikelets, which are often borne two in each raceme.

3b. *Themeda gigantea* (Cav.) Hack. var. *novoguineensis* var. nov.

A typo differt spiculis masculinis dorso glabris vel scaberulis, haud ferrugineis vel brunneis basi tuberculatis patentibus dense hirsutis; spiculis hermaphroditis aristatis, aristis 2.5–3 cm. longis. A subsp. *caudata* Hackelii spiculis hermaphroditis in utroque racemo paucioribus et paullo brevioribus, spiculis masculinis brevioribus differt.

Racemes about 1.5 cm. long bearing usually 1 (rarely 2) perfect spikelets; involucral spikelets 8–9 mm. long, scabrous on the keels, otherwise scaberulous; perfect spikelets brown, 7–9 mm. long including the 2–3 mm. long callus, dorsally puberulent-hispidulous, the hairs sometimes obscure toward the base; fertile lemma awned, the awn brown, 2.5–3 cm. long, geniculate at about the middle, the column puberulent-hispidulous.

BRITISH NEW GUINEA: Central Division: Astrolabe, *Armit* 44 (US); Rona, Laloki River, alt. 450 m., *Brass* 3589 (A, US) (very tall robust species; leaves glaucous when young); Baroka, Nakeo District, alt. 50 m., *Brass* 3710 (GH, TYPE, US), April, 1933 (the dominant grass on the lower *Eucalyptus* forest ridges; grows in large leafy clumps up to 3 meters high; leaves glaucous green); Port Moresby, alt. 200 m., *Brass* 8782 (A, US) (open savannah forest; dominant grass on stony hillsides; clumps 1.5–2 meters high); Kanosia, alt. about 30 m., *Carr* 11235 (US, NY) (on open grassland; grass about 10 ft. tall).

Differs from the species in having involucral spikelets glabrous to scaberulous rather than pilose with reddish or brownish tuberculate-based spreading hairs, and in the awned fertile lemma. This variety is perhaps closest to subsp. *caudata* Hack., but in that the racemes bear 2 or 3 fertile spikelets, which are 9–11 mm. long, and involucral spikelets 12–15 mm. long.

Brass 8782 was reported as *Themeda australis* (R. Br.) Stapf by Chase (17, p. 316), but that species (treated here as a synonym of *T. triandra*) has involucral spikelets borne at the same level and the perfect spikelets dorsally glabrous, hispidulous only toward the apex.

48. *Germainia* Bal. and Poitr.

Germainia Bal. and Poitr., Bull. Soc. Hist. Nat. Toulouse 7: 344. 1873.

Racemes long-exserted, solitary, capitulate, terminating the culms, composed of 3–6 sessile marginal staminate spikelets, the broad coriaceous first glumes forming an urn-like receptacle enclosing the long-awned perfect pediceled spikelets; sessile staminate spikelets 2-flowered, the second glume and lemmas membranous-hyaline; pediceled perfect spikelets terete or

somewhat flattened, disarticulating obliquely with a sharp bearded callus, the glumes chartaceous-indurate; fertile lemma bearing a long stout twisted and geniculate awn; slender erect perennials with flat blades.

TYPE SPECIES: *Germainia capitata* Bal. and Poitr.

1. *Germainia capitata* Bal. and Poitr., Bull. Soc. Hist. Nat. Toulouse 7: 345. fig. 1-9. 1873; Hitchc., Brittonia 2: 129. 1936.

Culms tufted, erect, 50-70 cm. tall, simple, glabrous, the nodes bearded; sheaths mostly slightly shorter than the internodes, keeled above and more or less densely pilose; ligule membranous, 1-1.5 mm. long; blades flat, linear, 10-25 cm. long, 3-5 mm. wide, both surfaces pubescent to pilose; racemes (excluding the awns) 15-20 mm. long, 3-8 mm. wide, terete, stramineous to tawny; sessile spikelets about 18 mm. long, the first glume slightly shorter, truncate, emarginate, usually ciliate, the second glume and lemmas puberulent toward their tips; fertile spikelets brown-hirtellous, the awn about 6 cm. long, geniculate in the upper third, the column brownish hirsute.

BRITISH NEW GUINEA: Western Division: Wuroi, Oriomo River, alt. 10-30 m., Brass 5727 (GH, US) (sporadic in small tufts on savannah ridges); Mabaduan, Brass 6555 (A, US) (scattered in savannah forests); Wassi Kussa River, Brass 8637 (A, US) (common on sub-acid soils of savannah forests); MacGregor 7 (US). NETHERLANDS NEW GUINEA: Balim River, alt. 1600 m., Brass 11722 (A, US) (usually dominant grass on sandy soil of deforested slopes).

India to China and New Guinea.

49. *Heteropogon* Pers.

Heteropogon Pers., Syn. Pl. 2: 533. 1807.

Spikelets in pairs, the lower 1-several pairs homogamous, staminate or neuter, imbricate, persistent along the continuous rachis, the remaining pairs heterogamous, one sessile, perfect or pistillate, terete, long-awned, the other pediceled, staminate or neuter, similar to the homogamous spikelets below, the upper part of the rachis disarticulating obliquely at the base of each joint and forming a sharp barbed callus below the fertile spikelet, the pediceled spikelet readily falling, its pedicel obscured in the hairs of the callus; staminate spikelets awnless, the glumes membranous; first glume asymmetrical, one submarginal keel rather broadly winged, the other wingless; second glume narrower, symmetrical; lemmas hyaline, epaleate; fertile spikelets terete, the glumes coriaceous, the first brown-hirsute, enfolding the second; lemmas hyaline; awn of the fertile spikelets stout, twice geniculate, twisted and hirsute below the upper bend. Perennials or annuals with solitary spikelike cylindrical racemes terminating the culms and upper branches.

TYPE SPECIES: *Heteropogon glaber* Pers. = *H. contortus* (L.) Beauv. (*Andropogon contortus* L.).

KEY TO THE SPECIES

1. Fertile spikelets 6-8 mm. long including the 2 mm. long callus; plants 30-90 cm. tall. 1. *H. contortus*.
1. Fertile spikelets 12-14 mm. long including the 6 mm. long callus; plants robust, 1.5-3 meters tall. 2. *H. triticeus*.

1. *Heteropogon contortus* (L.) Beauv. ex. Roem. & Schult., Syst. Veg. 2: 836. 1817; C. T. White, Proc. Roy. Soc. Queensl. 34: 15. 1923; Hitchc., Lingnan Sci. Jour. 7: 250. *pl.* 11. 1931, U. S. Dept. Agric. Misc. Publ. 200: 756. *fig.* 1677. 1935; Brittonia 2: 129. 1936.

Andropogon contortus L., Sp. Pl. 1045. 1753; F. Muell., Pap. Pl. 1: 46. 1876. Type from India.

Heteropogon hirtus Pers., Syn. Pl. 2: 533. 1807. Based on *Andropogon contortus* L.

Perennial; culms tufted, erect, branching above, 30–90 cm. tall; sheaths compressed-keeled, glabrous; ligule membranous, about 1 mm. long, ciliate; blades linear, flat or folded, 3–6 mm. wide, scaberulous at least above and on the margins; racemes 3–7 cm. long, dorsiventral, straight or slightly curved; sessile spikelets 6–8 mm. long including the 2 mm. long callus, pubescent, dark brown, nearly hidden by the imbricate pediceled spikelets, the awn 6–10 cm. long; sterile spikelets with the first glume papillose-hispid toward the margins and the tip or sometimes nearly glabrous.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., Brass 3632 (GH, US) (one of the principal grasses of the lowland savannahs; not plentiful at this altitude); Kanosia, Carr 11174 (NY) (open savannah land). NORTH-EAST NEW GUINEA: Morobe District: Kajabit, Clemens 10713e, 10515 (US).

Tropical and warmer regions of both hemispheres.

2. *Heteropogon triticeus* (R. Br.) Stapf, Kew Bull. 1912: 432. 1912; Chase, Jour. Arnold Arb. 20: 316. 1939.

Andropogon triticeus R. Br., Prodr. Fl. Nov. Holl. 1: 201. 1810; Hack. in DC., Monogr. Phan. 6: 588. 1889. Type from Australia.

Perennial; culms robust, erect, 1.5–3 meters tall, glabrous; sheaths glabrous or nearly so, the lower overlapping, compressed-keeled, the upper shorter than the internodes, rounded or somewhat keeled above; ligule 1–1.5 mm. long, membranous, irregularly ciliate; blades usually folded (at least when dry), 40–60 cm. long, gradually tapering to the attenuate apex, more or less scabrous, at least on the margins, the upper surface sometimes sparsely pilose; racemes dorsiventral, similar to those of *Heteropogon contortus*, but considerably larger, as much as 15 cm. long exclusive of the awns; sessile spikelet 12–14 mm. long, including the 6 mm. long callus, puberulent, dark brown, almost completely hidden by the imbricate pediceled spikelets, the awn stout, 10–16 cm. long; glumes of sterile spikelets glabrous.

BRITISH NEW GUINEA: Western Division: Mabaduan, Brass 6538 (A, US) (of localized distribution on drier soils of savannah forest, dominant where it occurs).

India to Malaysia, Australia, and New Guinea.

A much larger, coarser, more robust species than *Heteropogon contortus*. The leaf blades are long, firm and attenuate, while those of *H. contortus* are usually flat and thinner in texture. The inflorescences of these two species are very similar, but that of *H. triticeus* is larger and coarser with larger spikelets.

Tribe III. MAYDEAE

Spikelets unisexual, dissimilar, awnless, the sexes in different inflorescences or in different parts of the same inflorescence, the pistillate below; staminate spikelets 2-flowered, usually paired, one sessile, the other pedi-

celed, in solitary or paniced spikelike racemes; sessile spikelets 2-flowered, the lower floret sterile, solitary or sometimes accompanied by a pediceled staminate spikelet, embedded in hollows of a thickened articulate axis, enclosed in a thickened sheath, or crowded in rows on a thickened axis (cob); glumes membranous or indurated, lemmas hyaline. Annuals or perennials with usually tall culms and broad flat leaves.

KEY TO THE GENERA

1. Staminate and pistillate spikelets in separate portions of the same inflorescence, the pistillate below.
 2. Spikes elongate, the pistillate portion several to many-flowered, disarticulating into as many 1-seeded joints.....50. *Polytoca*.
 2. Spikes short, the pistillate portion 1-3-flowered, permanently enclosed within a shiny bead-like sheathing bract.....51. *Coix*.
1. Staminate and pistillate spikelets in separate inflorescences, the staminate in a terminal panicle, the pistillate borne in axils of the leaves.....52. *Zea*.

50. *Polytoca* R. Br.

Polytoca R. Br. in Bennett, Pl. Jav. Rar. 20. *pl.* 5. 1838.

Spikelets unisexual, in the lower part of the raceme one sessile and pistillate, more or less sunken in the rachis, the other pediceled and staminate (in ours) or more or less reduced; spikelets in the upper part of the raceme all staminate (often the uppermost racemes entirely staminate); rachis of the staminate part of the raceme continuous, falling entire, of the lower pistillate part fragile, disarticulating into as many 1-seeded joints as there are spikelets; glumes of the staminate spikelets membranous or chartaceous, those of the pistillate spikelets coriaceous. Tall robust perennials with flat blades and terminal and lateral spikelike racemes borne in the upper sheaths.

TYPE SPECIES: *Polytoca barbata* R. Br. = *P. digitata* (L. f.) Henr. (*Apluda digitata* L. f.).

1. *Polytoca macrophylla* Benth., Jour. Linn. Soc. Bot. 19: 52. 1881; Hack., Bot. Jahrb. 13: 263. 1890; Henr., Med. Rijks Herb. Leiden 67: 12. *fig.* 1, 2. 1931; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 186. 1940. Type from the Louisiade Archipelago.

Culms caespitose, robust, freely branching, 2-3 meters tall, erect or somewhat geniculate at base and rooting from the lower nodes; sheaths slightly shorter than the internodes, glabrous or more or less papillose-hispid near the margins; ligule wanting or very short; blades flat, as much as 90 cm. long and 8 cm. wide, smooth and glabrous, the margins scabrous; rachis joints in the lower part of the raceme 5-7 mm. long, clavate and somewhat concave on the side next to the sessile spikelet, more or less pubescent on the back, especially toward the base; pistillate spikelets lanceolate, more than 1 cm. long, the first glume glabrous but minutely papillose-roughened on the back above the smooth callus, scabrous on the upper margins; pedicels of the pediceled staminate spikelets fused to the rachis joint for more than half their length; staminate spikelets about as large as the pistillate in the lower part of the raceme, reduced in size upward.

BRITISH NEW GUINEA: Central Division: Rona, Laloki River, alt. 450 m., *Brass 3617* (GH, US) (rocky savannah slopes; tall erect species growing in clumps;

hairs stiff and irritant); Mafulu, alt. 1250 m., *Brass 5485* (US) (massed in an old native garden); Kanosia, *Carr 11344* (NY) (river bank); Gulf Division: Kerema, *Brass 1203* (GH, US) (open ridges near coast; tall clumps of grass 5 ft. high); Northern Division: About 13 miles northwest of Oro Bay, *Reeder 842* (A, US) (low ground at edge of swamp); Goodenough Island: Haiwali, *Burcham 126* (US) (edge of clearing in rain forest). NORTHEAST NEW GUINEA: Morobe District: Kajabit, Markham Valley, *Clemens 10552A* (US) (growing on stream margins; plants 10 ft. or more tall); Boana, *Clemens 41608* (US). NETHERLANDS NEW GUINEA: Mamberamo, Otken River, alt. about 60 m., *Docters van Leeuwen 11368* (GH, NY). BISMARCK ARCHIPELAGO: Duke of York Islands: *W. Bradth 5* (US); New Britain: Rabaul, *Herre 198* (NY) (growing on roadsides; plants 10 ft. high). SOLOMON ISLANDS: San Cristoval: Waimamura, *Brass 2629* (GH) (on old village and garden clearings; blades to 8 cm. wide); Bougainville: Kugumaru, *Kajewski 1989* (GH) (a pest in native gardens).

Ternate to New Guinea and the Louisiade Archipelago.

The report by F. Muell. (Pap. Pl. 2: 20. 1885) of *Chionachne cyathopoda* (F. Muell.) Benth. = *Polytoca cyathopoda* (F. Muell.) Bailey is probably referable to this species.

51. Coix L.

Coix L., Sp. Pl. 972. 1753, Gen. Pl. ed. 5. 419. 1754.

Spikelets unisexual; staminate spikelets 2-flowered, in twos and threes on a slender continuous rachis; glumes membranous, lanceolate, obscurely nerved; lemmas and paleas hyaline, the stamens 3; pistillate spikelets 3 together, one fertile, the other two sterile and reduced to narrow tubular glumes; glumes of the fertile spikelet several-nerved, hyaline below, chartaceous in the upper pointed part, the first glume broad, enfolding the spikelet, the second narrower; sterile lemma similar but a little narrower; fertile lemma and palea hyaline; inflorescence consisting of an ovate, oval, or somewhat cylindrical pearly white or drab bead-like, very hard involucre (much modified sheathing bract) containing the pistillate portion of the inflorescence, the points of the pistillate spikelets and the slender axis of the staminate portion of the inflorescence protruding from the orifice at the apex, the staminate portion as much as 6 cm. long, soon deciduous. Annuals or perennials with branching culms and broad flat blades, the inflorescences numerous on stout peduncles clustered in the axils of the leaves.

TYPE SPECIES: *Coix Lacryma-Jobi* L.

1. *Coix Lacryma-Jobi* L., Sp. Pl. 972. 1753; Hack., Bot. Jahrb. 6: 237. 1885; Hitchc., U. S. Dept. Agric. Misc. Publ. 200: 765. fig. 1691. 1935; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 190. fig. 103. 1940. Type from India.
Coix Lacryma L., Syst. Nat. ed. 10. 1261. 1759 (presumably based on *C. Lacryma-Jobi* L.).
Coix Lacryma-Jobi L. var. *novoguineensis* Pilger, Bot. Jahrb. 52: 171. 1914. Type from Northeast New Guinea.

Annual; culms erect, stout, much branched upwards, 1–3 meters tall; sheaths glabrous; ligule membranous, ciliate, about 1 mm. long; blades glabrous, narrowly lanceolate, often cordate at base, acute, 10–60 (the lower sometimes to 120) cm. long, 2–5 cm. wide, the margins serrate-scabrous; staminate racemes 1–6 cm. long, glabrous; spikelets 8–10 mm.

long, the first glume winged on the keels; false fruits ovoid-globose, 6–12 mm. long, hard and shiny at maturity.

BRITISH NEW GUINEA: Central Division: Javarie, *White* 373 (US). NORTHEAST NEW GUINEA: Madang District: Sepik River, *Herre* 322, 335 (NY) (plants 6–8 ft. high, growing in water). NETHERLANDS NEW GUINEA: Arfak Mountains, Female Lake, alt. about 3000 m., *Pratt* in 1908 (US); Nassau Region: Explorat Biv., alt. about 1200 m., *Docters van Leeuwen* 10804 (GH). SOLOMON ISLANDS: Bougainville: Kugumaru, alt. 150 m., *Kajewski* 1840 (GH) (rain-forest; tall grass up to 2 meters tall).

Warmer regions of the world. Sometimes cultivated for the "beads," which are used as ornaments, or for the edible grains.

1a. *Coix Lacryma-Jobi* L. var. *stenocarpa* (Oliver) Stapf in Hook. f., Fl. Brit. Ind. 7: 100. 1897.

Coix Lachryma L. var. *stenocarpa* Oliver, Hook. Ic. 18: pl. 1764. 1888. Type from Burma.

Coix stenocarpa (Oliver) Balansa, Jour. de Bot. 4: 77. 1890. Type from Burma.

Coix tubulosa Hack., Bot. Jahrb. 13: 260. 1890. Type from Northeast New Guinea.

Coix Lacryma-Jobi L. var. *tubulosa* (Hack.) K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 164. 1901.

Differs from the species in having nearly cylindrical rather than ovate or elliptical false fruits. In the specimen cited below the false fruits are about 3.5 mm. in diameter and 10–12 mm. long.

BRITISH NEW GUINEA: Eastern Division: Aisa River, *Brass* 1417 (GH) (tall riverbank grass 5–6 ft. tall; fruit glossy, gray).

Indo-Malayan region to New Guinea.

52. *Zea* L.

Zea L., Sp. Pl. 971. 1753, Gen. Pl. ed. 5. 419. 1754.

Spikelets unisexual; staminate spikelets 2-flowered, in pairs on a rather slender trigonous continuous rachis, one of the pair nearly sessile, the other pediceled; glumes membranous, acute; lemmas and paleas hyaline, the stamens 3; pistillate spikelets 1-flowered, densely crowded in many vertical rows on a cylindrical spongy rachis (cob); glumes broad, rounded or emarginate at apex; lemmas hyaline, the styles filiform, very long and slender, stigmatic nearly to the base. Robust annuals with terminal panicles of staminate racemes and axillary short-peduncled pistillate spikes (ears) enclosed in numerous sheaths (husks), the styles protruding from the end as a mass of silky threads.

TYPE AND ONLY SPECIES: *Zea Mays* L.

1. *Zea Mays* L., Sp. Pl. 971. 1753; Kärnbach, Bot. Jahrb. 16: Beibl. 37: 11. 1892; K. Schum. & Lauterb., Nachtr. Fl. Deutsch. Schutzgeb. Südsee 56. 1905; Pilger, Nat. Pflanzenfam. ed. 2. 14e: 194–201. fig. 106. 1940. Type from America.

Culms erect, robust, more or less succulent, 1–4 meters tall, unbranched, the basal internodes very short, the lower nodes giving rise to adventitious "prop roots"; blades broad and flat, sword-shaped, the midrib prominent.

Widely distributed, in cultivation, in temperate and tropical regions of the world. Known only in cultivation.

Numerous species have been described, but most botanists consider that *Zea* is monotypic but highly variable. No herbarium specimens of this species from New Guinea have been seen, but living plants were

observed in native gardens there by the writer in 1943-44. To what extent this species is cultivated by natives in New Guinea is unknown to me.

DOUBTFUL AND EXCLUDED SPECIES

Andropogon australis Spreng. sensu K. Schum., Notizbl. Bot. Gart. Berlin 1: 207. 1896 = *Sorghum*.

Probably a misidentification of *Sorghum nitidum*.

Andropogon australis Spreng. var. *laeviramis* Hack. apud K. Schum., Bot. Jahrb. 9: 197. 1887.

As far as I can discover, the above is a *nomen nudum*. Schumann and his co-workers used the name on at least three occasions, but a description was never published.

Andropogon halepensis Sibth. var. *propinquus* (Kunth) Hack., Bot. Jahrb. 6: 240. 1885, in Engler, Forschungsreise Gazelle 4(7): 5. 1889.

The above record from the New Guinea region probably represents a misidentification for *Sorghum nitidum*. The latter species is common in the region and is picked up by most collectors. I have seen no specimens of *S. propinquus* from New Guinea. A further reason for believing that the plants were *S. nitidum* is the fact that, although common, *S. nitidum* was not reported by the above authors.

Andropogon Sorghum (L.) Brot. subsp. *halepensis* (L.) Hack. var. *propinquus* (Kunth) Hack. in DC., Monogr. Phan. 6: 503. 1889; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 173. 1901.

See note under *Andropogon halepensis* var. *propinquus*.

Anthistiria ciliata L. f. sensu F. Muell., Pap. Pl. 1: 47. 1876.

According to C. T. White (75, p. 15) the specimen which Mueller cites under this name is *A. imberbis* Retz. = *Themeda triandra* Forsk.

Arthraxon linifolius Henr., Blumea 4: 525. 1941.

No specimens of this nor of the following species were available to me. From Henrard's descriptions they seem to be very close to *A. hispidus*.

Arthraxon pallidus Henr., Blumea 4: 526. 1941.

See comment above.

Chrysopogon Gryllus (L.) Trin. sensu F. M. Bailey, Queensl. Agric. Jour. 23: 220. 1909.

This species has not been reported otherwise from New Guinea. I am not certain which species Bailey had, but it was probably *C. elongatus* or even *C. aciculatus*.

Erianthus pedicellaris (Trin.) Hack. sensu K. Schum., Notizbl. Bot. Gart. Berlin 1: 46. 1895.

This is the only report of this species from the region. Perhaps it represents a misidentification.

Eriochloa punctata (L.) Desv. sensu F. Muell., Pap. Pl. 1: 74. 1876; C. T. White, Proc. Roy. Soc. Queensl. 34: 15. 1923.

Probably the plants referred to this species are *E. procera* (Retz.) C. E. Hubb. I have seen no specimens of *E. punctata* from New Guinea.

Ischaemum aristatum L. var. *arfakense* Rendle in Gibbs, Contr. Phytogr. Fl. Arfak Mt. 89. 1917.

From the description this appears to be merely a synonym of *I. aristatum* L. (sensu meo) as applied to the New Guinea material.

Ischaemum aristatum L. var. *cylindricum* Pilger, Bot. Jahrb. 52: 171. 1914.

Unfortunately no specimens of *I. aristatum* were available from this region (Northeast New Guinea). The description suggests that this variety may be a synonym of *I. aristatum* L. subsp. *barbatum* Hack.

Ischaemum chordatum (Trin.) Hack., Bot. Jahrb. 13: 260. 1890; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 170. 1901.

Spodiopogon chordatum Trin., Mém. Acad. St. Pétersb. VI. 2: 302. 1832. Marianas and Carolines.

From Trinius' rather lengthy description, this species appears to be a synonym of *I. digitatum* Brongn.

Ischaemum rugosum Salisb. sensu Ridley, Trans. Linn. Soc. II. Bot. 9: 249. 1916.

I have seen no specimens nor do I know of any other record of this species from New Guinea. Ridley states that his plant is a dwarf about 15 cm. tall.

Microstegium calochloum (Lauterb. & K. Schum.) Pilger, Nat. Pflanzenfam. ed. 2. 14e: 122. 1940.

Pollinia calochloa Lauterb. & K. Schum. in K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 167. 1901. Type from Northeast New Guinea.

No New Guinea specimens examined match the description precisely, but from the ample description it seems to be only a variety of *Microstegium ciliatum* (Trin.) A. Camus. The ligule is said to be only about 0.5 mm. long, and the rachis joints are completely glabrous. The remainder of the description applies to *Pollinia ciliata* Trin. (sensu Hack. in DC., Monogr. Phan. 6: 176. 1889).

Microstegium glabratum (Brongn.) A. Camus, Ann. Soc. Linn. Lyon 68: 201. 1921; Ohwi, Bot. Mag. (Tokyo) 56: 10. 1942.

Eulalia glabrata Brongn. in Duperry, Bot. Voy. Coquille 93. pl. 19. 1831. Type from the Society Islands.

Pollinia glabrata (Brongn.) Trin., Mém. Acad. St. Pétersb. VI. 4: 89. 1836.

From Brongniart's description and figure, this species appears to be closely related to *Microstegium nudum* (Trin.) A. Camus, and I suspect it may be a synonym. The two species follow one another in Hackel's Monograph, and the distinctions separating them in that work seem very slight.

Panicum brevifolium L. sensu F. Muell., Pap. Pl. 2: 19. 1855.

This species was reported from New Guinea only by F. von Mueller in 1885. I have seen no reports from New Guinea since that date and suspect that it was probably a misidentification. Perhaps Mueller's plant was *Cyrtococcum patens* (L.) A. Camus, as that species bears a superficial resemblance to *Panicum brevifolium*.

Panicum filiforme L. sensu K. Schum., Notizbl. Bot. Gart. Berlin 1: 208. 1896 = *Digitaria filiformis* (L.) Koel.

This species was originally described from North America. I know of no other record of this plant from the New Guinea area. Perhaps Schumann's plant was *D. violascens* Link, which is common in the region. It is listed by Schumann as being a common weed of cultivated ground.

Panicum foliosum R. Br. sensu K. Schum., Bot. Jahrb. 9: 196. 1887 = *Brachiaria foliosa* (R. Br.) Hughes.

Reported from Finschhafen by Schumann. I know of no other record. It seems somewhat unlikely that this Australian species should occur in Northeast New Guinea and yet not be represented in the numerous collections which have been made on the Australian side of British New Guinea. Perhaps this represents a misidentification of *Brachiaria subquadripata* (Trin.) Hitchc.

Panicum interruptum Willd. sensu Ridley, Trans. Linn. Soc. II. Bot. 9: 248. 1916.

From a fragment of the type specimen (at US), consisting of two somewhat crushed spikelets, this species seems referable to *Sacciolepis*. This is the only report of the species from New Guinea known to me.

Panicum javanicum Poir. sensu Burkill, Proc. Camb. Phil. Soc. 9: 93. 1896; K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 177. 1901.

The original description is too inadequate to permit positive identification. Trinius (Mém. Acad. St. Pétersb. VI. 3: 243. 1834) lists *Urochloa panicoides* Beauv. as a synonym. Hooker f. (Fl. Brit. Ind. 7: 36. 1896), in a note under *P. javanicum*, states: "Kunth (Revis. Gram. i. 206) says, under *Urochloa panicoides*, that he has examined in Desfontaine's Herbarium the type of Poiret's *P. javanicum*, and identified it, which he cites as a syn. of *Urochloa panicoides*, but his figure of which again quite accords with a narrow-leaved form of *P. Helopus*, Trin. This requires the adoption [of] the name *javanicum* (by misprint *japonicum* in Kunth Revis.), for the species. Bentham, on the other hand (Fl. Austral. vii. 477), says that Munro has seen an authentic specimen of *javanicum*, and that it is quite distinct from *P. Helopus*. I have no means of verifying either authority."

Hitchcock (Jour. Wash. Acad. Sci. 9: 551. 1919) confidently states that *P. javanicum* Poir. is a synonym of *Panicum panicoides* (Beauv.) Hitchc. (*Urochloa panicoides* Beauv.). He states that since *P. javanicum* Poir. is described as having glabrous spikelets, and Beauvois' figure of *Urochloa panicoides* accompanying the original description shows the spikelets to be glabrous, they are synonyms. He further states that *P. Helopus* has pubescent spikelets and is thus excluded from consideration. It is interesting to note that all the specimens in the U.S. National Herbarium which have been labeled *P. javanicum* are from India — none are from Java. This leaves some doubt, I think, as to the identity of *P. javanicum*. Since C. E. Hubbard & Vaughan (39, p. 74) state under *Urochloa panicoides* that specimens of this species have been referred to *Panicum javanicum* Poir., it seems apparent that these authors do not agree with Hitchcock's interpretation.

Panicum multinode Lam. sensu F. Muell., Pap. Pl. 1: 31. 1876.

Mueller states that this seems referable to *P. repens* L. I have seen no specimens of this latter species from New Guinea. *Panicum multinode* Lam. is referable to the genus *Cyrtococcum*, which bears little resemblance to *Panicum repens*. Without seeing the actual specimens (of which none are cited by Mueller) it is impossible to determine to what species Mueller's report applies.

Panicum papuanum Mez, Bot. Jahrb. 56: Beibl. 125: 5. 1921.

Mez' original description is brief and quite inadequate. He states merely "Laminae anguste lineares. Nodi glabri. Inflorescentia laxe 3-pinnata. Spiculae quam pedicelli gracillimi breviores, glabrae, ellipticae, acutae, 2 mm. longae. Glumae I., II. = 7-, III. = 9-nervia. Flos inferior abortivus palea minuta. Palea floris herm. stramineae, politissimae." The specimen questionably referred to this species by Chase (17, p. 309) is *Panicum mindanaense* Merr. In that specimen both glumes and the sterile lemma are 5-nerved.

Panicum parviflorum R. Br. sensu K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 177. 1901 = *Digitaria parviflora* (R. Br.) Hughes.

This Australian species is reported from New Guinea only in Schumann's publications and probably represents a misidentification of another species such as *D. violascens*.

Panicum plicatum Lam. sensu F. Muell., Vict. Nat. 2: 20. 1855; Ridley, Trans. Linn. Soc. Bot. 9: 248. 1916; C. T. White, Proc. Roy. Soc. Queensl. 34: 16. 1923.

This is probably the species which I am calling *Setaria palmaefolia*. *Setaria plicata* (Lam.) T. Cooke is considered to be distinct by some authors, but the differences seem slight. I am not citing it as a synonym of *S. palmaefolia* pending further study.

Panicum trachyrachis Benth. sensu Hack., Bot. Jahrb. 13: 258. 1890; K. Schum., Notizbl. Bot. Gart. Berlin 2: 92. 1898.

An Australian species related to *P. virgatum* L. Reported by the German workers from Northeast New Guinea and the Bismarck Archipelago. The species may well occur in New Guinea, but I have seen no specimens.

Panicum virgatum L. sensu F. Muell., Pap. Pl. 1: 47. 1876; F. M. Bailey, Queensl. Agric. Jour. 9: 411. 1901.

This is the species which Bentham calls *P. trachyrachis* Benth. (See note under that species.)

Paspalum foliosum (R. Br.) K. Schum. & Hollr., Fl. Kais. Wilhelmsland 21. 1889.

Obviously an error for *Panicum foliosum* R. Br. = *Digitaria foliosa* (R. Br.) Hughes.

Paspalum miliare (Lam.) K. Schum. & Hollr., Fl. Kais. Wilhelmsland 21. 1889.

An error for *Panicum miliare* Lam. In K. Schum. & Lauterb. (69, p. 179), *P. miliare* sensu K. Schum. in Fl. Kais. Wilhelmsland (non Lam.) is listed as a synonym under *Panicum caesium* Nees = *P. cambogiense* Balansa.

Paspalum parviflorum (R. Br.) K. Schum. & Hollr., Fl. Kais. Wilhelmsland 21. 1889 = *Digitaria parviflora* (R. Br.) Hughes.

Obviously an error in copying *Panicum parviflorum*. See note under that species.

Pennisetum cenchroides (L.) Rich. sensu F. M. Bailey, Queensl. Agric. Jour. 23: 220. 1909 = *Pennisetum ciliare* (L.) Link.

This species occurs in Australia and, although I have seen no specimens, perhaps also in New Guinea. The above is the only record from New

Guinea known to me. C. T. White (75, p. 16) says Bailey's plant is *Cenchrus echinatus* L.

Rottboellia brevis Chauvin ex Steud., Syn. Pl. Glum. 1: 361. 1854.

This species was described from a specimen collected on the island of Waigiou. Hackel (23, p. 313) lists it under "species inextricabilis." I have no further information.

Rottboellia Coelorachis Forst. sensu Hack. in Engler, Forschungsreise Gazelle 4(7): 4. 1889.

According to Hackel (23, p. 294) and Pilger (59, p. 138) this is a distinct species from *R. exaltata*. I have seen no specimens which I could segregate.

Setaria aurea Hochst. sensu Hack., Denkschr. Akad. Wiss. Math.-Naturw. (Wien) 89: 495. 1913.

This is apparently the species which I am calling *Setaria pallide-fusca* (Schum.) Stapf & Hubb., as there are some sheets in the U.S. National Herbarium labeled *S. aurea* which seem to be *S. pallide-fusca*.

Setaria verticillata (L.) Beauv. sensu K. Schum., Notizbl. Bot. Gart. Berlin 2: 94. 1898.

The above is the only report of this species from the New Guinea region known to me. It may well occur there, but I have seen no specimens.

Stenotaphrum subulatum Trin. sensu Hack., Bot. Jahrb. 6: 237. 1885; F. Muell., Pap. Pl. 6: 19. 1885; K. Schum., Bot. Jahrb. 9: 196. 1887.

The above reports were all based on a single collection. No other report of this species from New Guinea is known to me. It is perhaps a misidentification or the locality of the specimen may be erroneous.

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LIST OF CITED SPECIMENS

- ARMIT, W. 44. *Themeda gigantea* var. *novoguineensis*; 55. *Imperata exaltata*.
- ARNOT, W. E. 38. *Digitaria Baileyi*.
- BAIM, T. C. —. *Pogonatherum paniceum* (March 12, 1943).
- BAUERLEN, W. 40. *Echinochloa colonum*; 43. *Pogonatherum paniceum*; 60. *Erianthus arundinaceus*; 61. *Panicum cambogiense*.
- BRADTHE, W. 5. *Polytoca macrophylla*.
- BRASS, L. J. 514. *Ischaemum muticum*; 521. *Paspalum longifolium*; 522. *Apluda mutica*; 538. *Pennisetum macrostachyum*; 634. *Themeda gigantea* var. *amboinensis*; 765. *Themeda triandra*; 768. *Pogonatherum paniceum*; 776. *Rottboellia rottboellioides*; 920. *Miscanthus floridulus*; 1018. *Isachne Brassii*; 1177. *Ischaemum muticum*; 1183. *Paspalum scrobiculatum*; 1203. *Polytoca macrophylla*; 1205. *Themeda gigantea* var. *amboinensis*; 1213. *Ischaemum digitatum* var. *polystachyum*; 1229. *Paspalum vaginatum*; 1391. *Pogonatherum paniceum*; 1397. *Elyonurus citreus*; 1417. *Coix Lacryma-Jobi* var. *stenocarpa*; 1423. *Cyrtococcum oxyphyllum*; 1534. *Oplismenus hirtellus*;

1616. *Ischaemum muticum*; 2551. *Themeda triandra*; 2593. *Ischaemum littorale*; 2629. *Polytoca macrophylla*; 2646. *Ischaemum muticum*; 2732. *Cyrtococcum oxyphyllum*; 2813bis. *Ischaemum littorale*; 2817. *Paspalum conjugatum*; 2841. *Paspalum orbiculare*; 2857. *Themeda gigantea* var. *amboinensis*; 2857A. *Cyrtococcum oxyphyllum*; 2893. *Pogonatherum paniceum*; 3070. *Thuarea involuta*; 3126. *Themeda gigantea* var. *amboinensis*; 3241. *Themeda triandra*; 3386. *Pogonatherum paniceum*; 3405. *Isachne Schmidtii*; 3518. *Themeda gigantea*; 3558. *Andropogon micranthus*; 3586. *Ophiuros exaltatus*; 3589. *Themeda gigantea* var. *novoguineensis*; 3610. *Pennisetum macrostachyum*; 3613. *Apluda mutica*; 3617. *Polytoca macrophylla*; 3628. *Saccharum spontaneum*; 3629. *Sorghum nitidum*; 3631. *Panicum viale*; 3632. *Heteropogon contortus*; 3639. *Brachiaria fusiformis*; 3647. *Oplismenus hirtellus*; 3692. *Themeda triandra*; 3701. *Hackelochloa granularis*; 3702. *Rottboellia rottboellioides*; 3710. *Themeda gigantea* var. *novoguineensis*; 3713. *Cymbopogon procerus*; 3723. *Themeda triandra*; 3724. *Ophiuros exaltatus*; 3820. *Cyrtococcum oxyphyllum*; 3935. *Paspalum conjugatum*; 4132. *Isachne villosa*; 4191. *Miscanthus floridulus*; 4528. *Miscanthus floridulus*; 4642. *Isachne Myosotis*; 4721. *Imperata exaltata* subsp. *Merrillii*; 4723. *Miscanthus floridulus*; 4778. *Miscanthus floridulus*; 4787. *Arthraxon hispidus*; 4788. *Setaria montana*; 4789. *Sacciolepis indica*; 4792. *Setaria palmaefolia*; 4799. *Andropogon micranthus*; 4802. *Dimeria dipteros*; 4807. *Isachne globosa*; 4808. *Ischaemum digitatum* var. *polystachyum*; 4813. *Imperata exaltata*; 4817. *Hyparrhenia bracteata*; 4871. *Isachne arfakensis*; 5208. *Panicum sarmentosum*; 5270. *Pogonatherum paniceum*; 5310. *Rottboellia rottboellioides*; 5403. *Apluda mutica*; 5482. *Setaria pallide-fusca*; 5483. *Sacciolepis indica*; 5485. *Polytoca macrophylla*; 5513. *Pennisetum macrostachyum*; 5522. *Digitaria pruriens*; 5532. *Ischaemum digitatum* var. *polystachyum*; 5594. *Cyrtococcum oxyphyllum*; 5617. *Cyrtococcum patens*; 5710. *Eulalia trispicata*; 5725. *Cymbopogon procerus*; 5726. *Ischaemum aristatum*; 5727. *Germainia capitata*; 5733. *Eulalia irritans*; 5735. *Ophiuros exaltatus*; 5740. *Setaria pallide-fusca*; 5743. *Eremochloa bimaculata*; 5744. *Sacciolepis indica*; 5745. *Alloteropsis semialata*; 5827. *Sacciolepis indica*; 5828. *Panicum distans*; 5854. *Isachne confusa*; 5873. *Themeda triandra*; 5895. *Sorghum nitidum*; 5910. *Brachiaria holosericea*; 5911. *Dimeria ciliata*; 5922. *Paspalum longifolium*; 5923. *Panicum Archboldii*; 5926. *Eulalia trispicata*; 5927. *Themeda triandra*; 5928. *Ischaemum aristatum* subsp. *barbatum*; 5957. *Apluda mutica*; 5960. *Panicum mindanaense*; 5961. *Ischaemum fragile*; 5984. *Dimeria glabriuscula*; 5985. *Andropogon brevifolius*; 6001. *Hemarthria subulata*; 6014. *Thaumastochloa rariflora*; 6029. *Sacciolepis myosuroides*; 6040. *Ischaemum aristatum* subsp. *barbatum*; 6044. *Echinochloa colonum*; 6045. *Chrysopogon elongatus*; 6060. *Echinochloa crusgalli*; 6252. *Sorghum nitidum*; 6253. *Ischaemum aristatum* subsp. *barbatum*; 6254. *Rottboellia rottboellioides*; 6260. *Panicum nodosum*; 6269. *Themeda triandra*; 6270. *Setaria pallide-fusca*; 6283. *Chrysopogon elongatus*; 6285. *Paspalum vaginatum*; 6295. *Cyrtococcum patens*; 6296. *Rottboellia exaltata*; 6297. *Paspalum scrobiculatum*; 6300. *Echinochloa colonum*; 6301. *Brachiaria subquadripara*; 6303. *Panicum reptans*; 6305. *Digitaria pruriens*; 6339. *Ischaemum digitatum*; 6341. *Paspalum longifolium*; 6342. *Panicum Archboldii*; 6343. *Alloteropsis semialata*; 6350. *Panicum macrocladum*; 6364. *Cymbopogon procerus*; 6382. *Themeda gigantea* var. *amboinensis*; 6387. *Panicum distans*; 6395. *Cenchrus Brownii*; 6397. *Pennisetum macrostachyum*; 6404. *Andropogon annulatus*; 6408. *Paspalum vaginatum*; 6410. *Ischaemum muticum*; 6426. *Chrysopogon aciculatus*; 6431. *Apluda mutica*; 6474. *Themeda frondosa*; 6484. *Panicum Archboldii*; 6485. *Panicum mindanaense*; 6486. *Ischaemum fragile*; 6524. *Eulalia irritans*; 6537. *Ophiuros exaltatus*; 6538. *Heteropogon triticeus*; 6554. *Thaumastochloa rariflora*; 6555. *Germainia capitata*; 6568. *Panicum macrocladum*; 6582. *Erianthus arundinaceus*; 6585. *Echinochloa stagnina*; 6810. *Pogonatherum paniceum*; 6945. *Imperata exaltata*; 6948. *Paspalum scrobiculatum*; 6957. *Saccharum spontaneum*; 6961. *Sacciolepis indica*; 7364. *Isachne Brassii*; 7483. *Oplismenus hirtellus*; 7519. *Sacciolepis indica*; 7522. *Panicum mindanaense*; 7528. *Ischaemum digitatum*; 7529. *Paspalum scrobiculatum*; 7552. *Hemarthria subulata*; 7600. *Pseudoraphis squarrosa*; 7602. *Isachne*

globosa; 7613. *Hymenachne amplexicaulis*; 7643. *Ophiuros exaltatus*; 7644. *Sorghum nitidum*; 7645. *Eulalia irritans*; 7647. *Panicum paludosum*; 7768. *Themeda gigantea* var. *amboinensis*; 7771. *Apluda mutica*; 7773. *Cyrtococcum patens*; 7806. *Dimeria monostachya*; 7807. *Dimeria ciliata* var. *heteromorpha*; 7808. *Eremochloa ciliaris* var. *elata*; 7809. *Eulalia trispicata*; 7810. *Brachiaria holosericea*; 7812. *Andropogon brevifolius*; 7832. *Isachne confusa*; 7849. *Eremochloa ciliaris* var. *elata*; 7850. *Dimeria glabriuscula*; 7851. *Panicum mindanaense*; 7852. *Panicum mindanaense*; 7854. *Sacciolepis myosuroides*; 7874. *Ischaemum fragile*; 7880. *Sacciolepis indica*; 7883. *Setaria pallide-fusca*; 7889. *Cyrtococcum patens*; 7900. *Ischaemum aristatum*; 7920. *Elyonurus citreus*; 7924. *Alloteropsis semialata*; 7932. *Dimeria ciliata* var. *heteromorpha*; 7933. *Andropogon sanguineus*; 7934. *Ischaemum fragile*; 7950. *Eulalia trispicata*; 7957. *Panicum sarmentosum*; 8220. *Pogonatherum paniceum*; 8251. *Eulalia irritans*; 8254. *Rottboellia rottboellioides*; 8259. *Ischaemum aristatum*; 8260. *Ischaemum aristatum* subsp. *barbatum*; 8263. *Sorghum nitidum*; 8279. *Eulalia trispicata*; 8280. *Echinochloa crusgalli*; 8296. *Imperata cylindrica* var. *major*; 8302. *Paspalum scrobiculatum*; 8324. *Digitaria radicata*; 8325. *Paspalum conjugatum*; 8343. *Panicum distans*; 8351. *Sacciolepis indica*; 8370. *Cymbopogon procerus*; 8408. *Eremochloa bimaculata*; 8409. *Alloteropsis semialata*; 8460. *Chrysopogon filipes* var. *arundinaceus*; 8470. *Pseudoraphis squarrosa*; 8537. *Sclerandrium truncatiglume*; 8566. *Eulalia trispicata*; 8567. *Sorghum nitidum*; 8579. *Chrysopogon elongatus*; 8637. *Germainia capitata*; 8654. *Panicum marginatum*; 8665. *Sclerandrium truncatiglume*; 8695. *Digitaria Baileyi*; 8696. *Panicum distans*; 8697. *Eulalia trispicata*; 8713. *Sacciolepis indica*; 8735. *Cleistochloa Sclerachne*; 8751. *Ischaemum aristatum*; 8776. *Sacciolepis indica*; 8782. *Themeda gigantea* var. *novoguineensis*; 8787. *Andropogon annulatus*; 8815. *Ischaemum aristatum* subsp. *barbatum*; 8893. *Pennisetum macrostachyum*; 8909. *Ichnanthus vicinus*; 8920. *Saccharum spontaneum*; 9556. *Isachne Myosotis*; 10235. *Imperata exaltata* subsp. *Merrillii* [with E. Meyer-Drees]; 10704. *Isachne Myosotis*; 10735. *Arthraxon hispidus*; 10736. *Sacciolepis indica*; 10743. *Isachne globosa*; 10746. *Setaria montana*; 10901. *Eulalia leptostachys*; 10902. *Imperata exaltata* subsp. *Merrillii*; 11363. *Eulalia leptostachys*; 11374. *Saccharum spontaneum*; 11385. *Ischaemum digitatum*; 11471. *Setaria palmaefolia*; 11488. *Setaria montana*; 11491. *Imperata exaltata* subsp. *Merrillii*; 11524. *Sacciolepis indica*; 11542. *Isachne globosa*; 11559. *Isachne albens*; 11568. *Pogonatherum paniceum*; 11583. *Isachne Myosotis*; 11584. *Miscanthus floridulus*; 11616. *Andropogon spicigerus*; 11617. *Ischaemum pubescens*; 11618. *Sorghum nitidum*; 11631. *Pogonatherum paniceum*; 11678. *Themeda gigantea* var. *amboinensis*; 11722. *Germainia capitata*; 11723. *Andropogon brevifolius*; 11732. *Ischaemum pubescens*; 11738. *Dimeria dipteros*; 11777. *Pennisetum macrostachyum*; 11778. *Saccharum spontaneum*; 11793. *Echinochloa crusgalli*; 11798. *Apluda mutica*; 11803. *Echinochloa crusgalli*; 11805. *Andropogon spicigerus*; 11806. *Ischaemum digitatum*; 11809. *Miscanthus floridulus*; 11813. *Digitaria radicata*; 11814. *Setaria montana* [specimen at A]; 11814. *Setaria pallide-fusca* [specimen at US]; 11817. *Paspalum scrobiculatum*; 11822. *Digitaria violascens*; 11823. *Isachne globosa*; 11824. *Sacciolepis indica*; 11825. *Eulalia leptostachys*; 11845. *Andropogon spicigerus*; 12364. *Oplismenus hirtellus*; 12370. *Isachne villosa*; 12475. *Isachne villosa*; 13201. *Isachne Myosotis*; 13210. *Ichnanthus vicinus*; 13263. *Setaria palmaefolia*; 13264. *Saccharum spontaneum*; 13479. *Pogonatherum paniceum*; 13719. *Oplismenus hirtellus*; 13720. *Microstegium spectabile*; 13721. *Ischaemum digitatum* var. *polystachyum*; 13784. *Paspalum scrobiculatum*; 13785. *Echinochloa stagnina*; 13791. *Saccharum spontaneum*; 13942. *Panicum auritum*; 13946. *Panicum zizanioides*; 14055. *Isachne Brassii*.

BRITTON, M. E. 22. *Setaria italica*.

BURCHAM, L. T. 119. *Apluda mutica*; 120. *Digitaria pruriens*; 121. *Sorghum nitidum*; 122. *Paspalum scrobiculatum* var. *bispicatum*; 124. *Rottboellia rottboellioides*; 125. *Setaria pallide-fusca*; 126. *Polytoca macrophylla*; 128. *Panicum nodosum*; 129. *Paspalum scrobiculatum*; 130. *Paspalum orbiculare*; 131. *Alloteropsis semialata*; 133. *Setaria palmaefolia*; 134. *Paspalum paniculatum*; 135. *Cyrtococcum patens*; 136. *Chrysopogon aciculatus*; 137. *Oplismenus compositus*; 138. *Oplismenus hirtellus*;

139. *Cyrtococcum oxyphyllum*; 140. *Ischaemum digitatum* var. *polystachyum*; 141. *Andropogon micranthus*.

CARR, C. E. 11022. *Echinochloa colonum*; 11025. *Paspalum conjugatum*; 11031. *Digitaria pruriens*; 11032. *Panicum nodosum*; 11033. *Chrysopogon aciculatus*; 11048. *Panicum viale*; 11054. *Alloteropsis semialata*; 11091. *Panicum reptans*; 11104. *Panicum viale*; 11106. *Andropogon micranthus* var. *muticispiculus*; 11108. *Digitaria abortiva*; 11111. *Sorghum nitidum*; 11129. *Saccharum spontaneum*; 11133. *Themeda triandra*; 11134. *Ophiuros exaltatus*; 11135. *Sorghum nitidum*; 11180. *Cenchrus echinatus*; 11235. *Themeda gigantea* var. *novoguineensis*; 11244. *Imperata exaltata*; 11309. *Andropogon micranthus* var. *muticispiculus*; 11329. *Andropogon intermedius*; 11344. *Polytoca macrophylla*; 11345. *Pogonatherum paniceum*; 11355. *Setaria palmaefolia*; 11382. *Setaria surgens*; 11398. *Brachiaria subquadripa* var. *piligera*; 11413. *Ischaemum muticum*; 11417. *Thuarea involuta*; 11435. *Eriochloa procera*; 11439. *Digitaria sanguinalis*; 11440. *Digitaria pruriens*; 11445. *Spinifex littoreus* var. *longifolius*; 11503. *Cyrtococcum patens* var. *Warburgii*; 11546. *Alloteropsis semialata*; 11622. *Panicum creperum*; 11658. *Pennisetum macrostachyum*; 11736. *Ischaemum digitatum*; 11741. *Apluda mutica*; 11771. *Cyrtococcum oxyphyllum*; 11786. *Cyrtococcum oxyphyllum*; 11964. *Cyrtococcum trigonum*; 12236. *Microstegium spectabile*; 12362. *Isachne pauciflora*; 12412. *Isachne Myosotis*; 12525. *Panicum sarmentosum*; 12941. *Cyrtococcum oxyphyllum*; 12971. *Isachne Myosotis*; 14271. *Isachne villosa*.

CHALMERS, REV. J. 42. *Panicum sarmentosum*; 59. *Cyrtococcum oxyphyllum*; 71. *Eulalia irritans*; 72. *Panicum sarmentosum*.

CLEMENS, M. S. 34. *Sorghum laxiflorum*; 312. *Isachne Myosotis*; 1410. *Saccharum spontaneum*; 4053. *Sacciolepis indica*; 4105. *Isachne albens*; 4280. *Panicum ambiguum*; 4303. *Panicum sarmentosum*; 4307. *Hackelochloa granularis*; 4315. *Sacciolepis indica*; 4332. *Ichnanthus vicinus*; 4454. *Miscanthus floridulus*; 4498. *Setaria montana*; 4592. *Isachne albens*; 4725. *Eulalia leptostachys*; 4775. *Echinochloa crusgalli*; 4860. *Isachne villosa*; 4956. *Isachne villosa*; 5409. *Isachne albens*; 5476. *Echinochloa crusgalli*; 5756. *Oplismenus hirtellus*; 5856. *Isachne villosa*; 5924. *Isachne villosa*; 6097. *Isachne Myosotis*; 6120. *Digitaria perpusilla*; 6145. *Miscanthus floridulus*; 6548a. *Pogonatherum paniceum*; 6558. *Saccharum spontaneum*; 6958a. *Isachne albens*; 9209. *Isachne arfakensis*; 9239. *Isachne albens*; 10279. *Microstegium nudum*; 10359. *Digitaria violascens*; 10379. *Isachne albens*; 10441. *Sorghum laxiflorum*; 10458. *Andropogon micranthus*; 10459bis. *Alloteropsis semialata*; 10475. *Panicum reptans*; 10476-s. *Echinochloa colonum*; 10477. *Andropogon brevifolius*; 10515. *Heteropogon contortus*; 10540J. *Setaria pallide-fusca*; 10541. *Andropogon micranthus* var. *muticispiculus*; 10541bis. *Andropogon micranthus*; 10552. *Pogonatherum paniceum*; 10552A. *Polytoca macrophylla*; 10568. *Oplismenus compositus*; 10630. *Digitaria pruriens*; 10631. *Apluda mutica*; 10650. *Echinochloa crusgalli*; 10665. *Sorghum nitidum*; 10668b. *Imperata cylindrica* var. *major*; 10696. *Panicum paludosum*; 10706. *Paspalum longifolium*; 10713e. *Heteropogon contortus*; 10857. *Eulalia leptostachys*; 10955bis. *Sacciolepis indica*; 10980. *Sorghum laxiflorum*; 11047. *Paspalum orbiculare*; 11272. *Cyrtococcum patens*; 40782. *Hackelochloa granularis*; 40793. *Pennisetum macrostachyum*; 40838. *Ophiuros exaltatus*; 40867. *Hackelochloa granularis*; 40885. *Isachne Myosotis*; 41090. *Sorghum laxiflorum*; 41172. *Pennisetum macrostachyum*; 41238. *Ichnanthus vicinus*; 41356a. *Sacciolepis indica* mixed with *S. myosuroides*; 41608. *Polytoca macrophylla*; 41714. *Isachne villosa*; 41715. *Microstegium spectabile*; 41808. *Ichnanthus vicinus*; —. *Isachne Brassii* (October 20, 1940); —. *Brachiaria coccosperma* (February 21, 1940).

DOCTERS VAN LEEUWEN, W. M. 9252. *Paspalum conjugatum*; 9709. *Echinochloa crusgalli*; 9727. *Pennisetum macrostachyum*; 10167. *Echinochloa crusgalli*; 10498. *Digitaria radicata*; 10500. *Imperata exaltata*; 10787. *Isachne Myosotis*; 10804. *Coix Lacryma-Jobi*; 10809. *Sacciolepis indica*; 10814. *Setaria palmaefolia*; 11149. *Hymenachne amplexicaulis*; 11368. *Polytoca macrophylla*.

HARTMAN, E. 73. *Panicum sarmentosum*.

HERRE, A. W. 132. *Pennisetum macrostachyum*; 185. *Ischaemum muticum*; 198. *Polytoca macrophylla*; 231. *Imperata exaltata*; 284. *Saccharum spontaneum*; 313. *Setaria palmaefolia*; 319. *Echinochloa stagnina*; 322. *Coix Lacryma-Jobi*; 335. *Coix Lacryma-Jobi*.

HOMBRON, J. B. 1841. *Panicum ambiguum*.

JESWIET, J. —. *Saccharum spontaneum* (June, 1928); —. *Saccharum spontaneum* (July, 1928).

KAJEWSKI, S. F. 1779. *Setaria palmaefolia*; 1840. *Coix Lacryma-Jobi*; 1897. *Panicum cambogiense*; 1989. *Polytoca macrophylla*; 2139. *Cyrtococcum oxyphyllum*; 2245. *Pennisetum macrostachyum*; 2253. *Cyrtococcum patens*.

KANEHIRA, R., & S. HATUSIMA. 13093. *Panicum mindanaense* var. *villosa*; 13160. *Oplismenus hirtellus*; 13243. *Microstegium ciliatum* var. *laxum*; 13291. *Erianthus fastigiatus*; 13371. *Setaria pallide-fusca*; 13390. *Andropogon brevifolius* var. *cryptopodus*; 13588. *Isachne arfakensis*; 13826. *Sacciolepis indica*; 14019. *Isachne albens*; 14144. *Brachiaria subquadripara*; 14221. *Isachne Brassii*.

KING, REV. COPELAND. 1018. *Apluda mutica*; —. *Panicum cambogiense* (in 1912).

KLOSS, C. B.—. *Sacciolepis indica* (Jan. 1913).

LAUTERBACH, K. 24. *Pennisetum macrostachyum*.

LEDERMANN, C. 10444. *Isachne Brassii*.

MACFARLANE, S. 48. *Apluda mutica*.

MACGREGOR, SIR WILLIAM. 7. *Germainia capitata*; 8. *Eulalia irritans* var. *egregia*; 10. *Andropogon micranthus*; 11. *Setaria surgens*; 12. *Panicum sarmentosum*; 13. *Setaria surgens*; 14. *Echinochloa crusgalli*; 18. *Panicum macrocladum*; 19. *Rottboellia rottboellioides*; 20. *Andropogon micranthus*; 21. *Panicum viale*; 37. *Alloteropsis semialata*; 41. *Panicum sarmentosum*; 46. *Chrysopogon elongatus*; 50. *Isachne villosa*; 52. *Andropogon micranthus* var. *muticispiculus*; 53. *Eulalia irritans*; —. *Cenchrus Brownii* (in 1889).

NAUMANN, C. —. *Pennisetum macrostachyum* (Aug. 8, 1875).

PARKINSON, R. 45. *Sorghum nitidum*; 47. *Ischaemum muticum*; 64. *Themeda gigantea* var. *amboinensis*; 65. *Imperata exaltata*; 66. *Digitaria pruriens*.

PEEKEL, G. 301. *Digitaria longissima*.

PRATT, A. E. —. *Coix Lacryma-Jobi* (Dec. 1908).

REEDER, J. R. 799. *Paspalum conjugatum*; 801. *Andropogon micranthus* var. *muticispiculus*; 802. *Alloteropsis semialata*; 803. *Themeda triandra*; 804. *Setaria pallide-fusca*; 805. *Paspalum paniculatum*; 806. *Hackelochloa granularis*; 808. *Sorghum nitidum*; 809. *Rottboellia rottboellioides* [specimen at A]; 809. *Ophiuros exaltatus* [specimen at US]; 810. *Andropogon micranthus* var. *muticispiculus*; 811. *Digitaria longiflora*; 812. *Chrysopogon aciculatus*; 813. *Imperata exaltata*; 815. *Paspalum scrobiculatum* var. *bispicatum*; 817. *Digitaria radicata*; 818. *Paspalum scrobiculatum*; 819. *Apluda mutica*; 820. *Cyrtococcum oxyphyllum*; 821. *Eulalia trispicata*; 822. *Sorghum laxiflorum*; 823. *Sacciolepis indica*; 824. *Cyrtococcum patens*; 825. *Sacciolepis indica*; 826. *Paspalum scrobiculatum*; 828. *Saccharum spontaneum*; 829. *Digitaria pruriens*; 833. *Digitaria violascens*; 841. *Brachiaria subquadripara*; 842. *Polytoca macrophylla*; 845. *Ischaemum digitatum* var. *polystachyum*; 847. *Sacciolepis indica*; 849. *Andropogon brevifolius* var. *paradoxus*; 855. *Setaria pallide-fusca*; 868. *Oplismenus hirtellus*; 885. *Setaria palmaefolia*; 886. *Pogonatherum paniceum*; 904. *Panicum cambogiense*; 905. *Panicum mindanaense*.

RODATZ & KLINK. 69. *Oplismenus compositus*.

ROGERS, H. J. 3001. *Imperata cylindrica* var. *major*; 3003. *Andropogon micranthus* var. *muticispiculus*; 3004. *Themeda triandra*.

RUSSELL, DEKALB, JR. —. *Oplismenus compositus* (May 23, 1943).

SAWYER, F. E. 32. *Echinochloa colonum*; 34. *Paspalum conjugatum*; 51. *Rottboellia rottboellioides*; 52. *Echinochloa colonum*; 81. *Imperata cylindrica* var. *major*; 82. *Cenchrus echinatus*; 83. *Digitaria sanguinalis*; 91. *Panicum reptans*; 92. *Digitaria sanguinalis*; 93. *Paspalum orbiculare*; 94. *Paspalum scrobiculatum*; 108. *Paspalum conjugatum*; 143. *Sacciolepis indica*; 144. *Chrysopogon aciculatus*; 163. *Chrysopogon aciculatus*.

SAWYER, W. S. 76. *Eulalia leptostachys*.

SIGAFOOS, R. 28. *Themeda triandra*; 68. *Sorghum nitidum*.

SMITH, L. S. 98 (N. G.). *Eulalia trispicata*.

TURNER, L. —. *Ischaemum Turneri*.

WARBURG, O. 20968. *Apluda mutica*.

WEINLAND, C. A. F. 75. *Digitaria pruriens*; 266. *Ophiuros exaltatus*; 276. *Cyrtococcum patens*; 278. *Cyrtococcum oxyphyllum*; 279. *Oplismenus compositus*; 281. *Sorghum nitidum*; 290. *Apluda mutica*; 347. *Ischaemum muticum*; 357. *Setaria pallide-fusca*; —. *Panicum reptans* (in 1889–91).

WHITE, C. T. 30. *Apluda mutica*; 373. *Coix Lacryma-Jobi*.

ZAHN, H. —. *Imperata cylindrica* var. *major*.

EXPLANATION OF PLATES

All figures are drawn from types.

PLATE V

Dimeria monostachya Reeder (*Brass* 7806): a. habit, $\times \frac{1}{2}$; b. spikelet, $\times 10$.
Hemarthria subulata Reeder (*Brass* 6001): c. inflorescence, $\times \frac{1}{2}$; d. & e. two views of lower spikelet attached to the rachis joint, $\times 10$.

PLATE VI

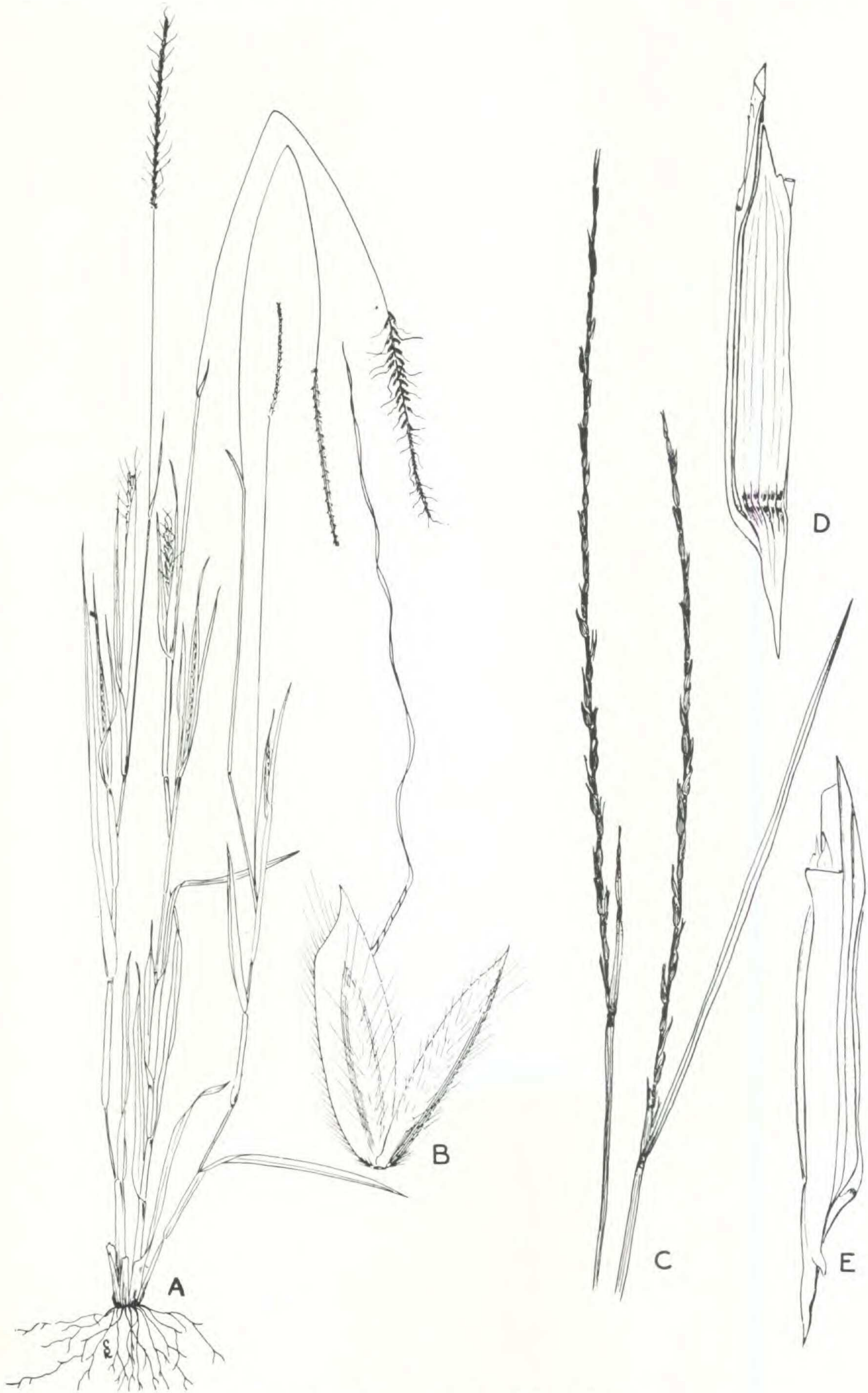
Dimeria dipteros Reeder (*Brass* 11738): a. habit, $\times \frac{1}{2}$; b. spikelet, $\times 10$.

PLATE VII

Ischaemum littorale Reeder (*Brass* 2593): a. habit, $\times \frac{1}{2}$; b. pair of spikelets attached to the rachis joint; c. dorsal view of first glume of the lower spikelet (b & c, $\times 10$).

Eulalia irritans (R. Br.) Kuntze var. *egregia* Reeder (*MacGregor* 8): d & e. two views of spikelet, $\times 10$.

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